TM 11-5820-401-10-2

OPERATOR'S MANUAL

EQUIPMENT DESCRIPTION

OPERATOR'S CONTROLS

PMCS

OPERATION

TROUBLE-SHOOTING

RADIO SETS

AN/VRC-12 (NSN 5820-00-223-7412), AN/VRC-43 (NSN 5820-00-223-7415)
AN/VRC-44 (NSN 5820-00-223-7417), AN/VRC-45 (NSN 5820-00-223-7418)
AN/VRC-46 (NSN 5820-00-223-7433), AN/VRC-47 (NSN 5820-00-223-7434),
AN/VRC-48 (NSN 5820-00-223-7435), AND
AN/VRC-49 (NSN 5820-00-223-7437)
(USED WITH INTERCOM SYSTEMS)

HEADQUARTERS, DEPARTMENT OF THE ARMY
WASHINGTON, D.C.
23 NOVEMBER 1982

WARNING

SERIOUS INJURY OR EVEN DEATH CAN HAPPEN IF THE FOLLOWING ARE NOT CAREFULLY OBSERVED WHEN INSTALLING AND USING THE ANTENNAS USED WITH YOUR RADIO SETS.

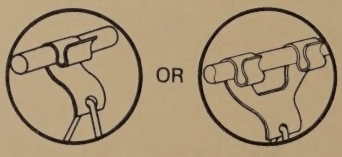
BEFORE ANY MISSION FIND OUT

1. ARE THERE ANY POWERLINES IN YOUR AREA OF OPERATION?
2. HOW HIGH ARE THESE POWERLINES?
3. HOW TALL ARE THE POLES OR TOWERS CARRYING POWERLINES?

MOBILE OPERATION WITH WHIP ANTENNAS DO NOT STOP YOUR TRACKED VEHICLE UNDER POWERLINES.

- IF POSSIBLE, TRY TO MAINTAIN MOBILE COMMUNICATIONS WITH YOUR ANTENNA(S) TIED DOWN.
- MAKE SURE AN ANTENNA TIP CAP IS SECURELY TAPED ON THE END OF ANY WHIP ANTENNA HAVING TWO OR THREE ANTENNA ELEMENTS.
- DO NOT LEAN AGAINST OR TOUCH ANY ANTENNA WHILE THE TRANSMITTER IS ON.
- DURING CROSS-COUNTRY OPERATION, DO NOT ALLOW ANYONE TO STICK AN ARM, LEG OR WEAPON OVER THE SIDES OF THE TANK. IF YOUR ANTENNA ACCIDENTALLY TOUCHES A POWERLINE AND A LEG, ARM OR WEAPON CONTACTS A DAMP BUSH OR THE GROUND, A SERIOUS OR FATAL ACCIDENT CAN HAPPEN.
- IF YOU ARE NOT SURE THAT AN ANTENNA ON YOUR TANK WILL CLEAR A POWERLINE, STOP BEFORE YOU GET CLOSE TO THE POWERLINE AND EITHER CAREFULLY TIE DOWN THE ANTENNA OR REMOVE ANTENNA SECTIONS TO MAKE SURE THAT YOU CAN SAFELY DRIVE UNDER THE POWERLINE.
- ELECTROMAGNETIC RADIATION. DO NOT STAND CLOSER THAN 20 INCHES (.5 METERS) TO ANTENNA AS-1729/VRC WHEN THE UNIT IS TRANSMITTING. HIGH LEVELS OF ELECTROMAGNETIC RADIATION EXIST IN THIS AREA.
- VEHICLES WITH AT-912 OR AS-1729 MOUNTS MORE THAN 6' ABOVE GROUND CAN STRIKE RAILROAD CROSSING POWER LINES IF THE WHIP ANTENNA COMES LOOSE FROM ITS TIE-DOWN DURING ROAD OR RAIL MOVEMENT. A SERIOUS OR FATAL ACCIDENT COULD HAPPEN.

Secure antenna tie-down for road or rail movement depending on tie-down clamp supplied.



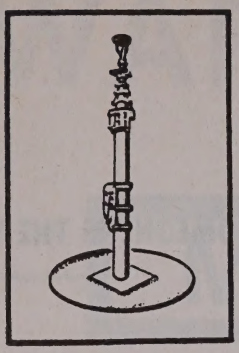
WITH THE ANTENNA TIED DOWN IN THE SECURE POSITION DAMAGE TO THE WHIP CAN OCCUR IF THE WHIP CONTACTS ANY FIXED OBJECT SUCH AS OVERHEAD BRIDGES, ETC. THE POSSIBILITY OF SERIOUS OR FATAL INJURY EXISTS TO OUTSIDE PERSONNEL FROM FLYING ANTENNA PARTS.

WARNING

NEVER ATTEMPT TO CARRY A RADIO RECEIVER TRANSMITTER YOURSELF. SERIOUS INJURY COULD RESULT.

FIXED OPERATION WITH LONG RANGE ANTENNAS

WARNING



TELESCOPING
ANTENNA MAST

EXTENDED RANGE
ANTENNA

NEVER ERECT THESE LONG RANGE ANTENNAS DIRECTLY UNDER POWERLINES.

If you must erect these long range antennas near powerlines, powerline poles or towers, or buildings with overhead powerline connections, never put the antenna closer than two times the antenna height from the base of the powerline, pole, tower or buildings.

NEVER ATTEMPT TO ERECT ANY LONG RANGE ANTENNA WITHOUT A FULL TEAM

Before erecting any long range antenna, inspect all the parts making up the antenna kit. Do not erect the antenna if any parts are missing or damaged.

Do as much of the assembly work as possible on the ground.

When erecting the antenna, allow only team personnel in the erection area.

Make sure that the area for the anchors is firm. If the ground is marshy or sandy, get specific instructions from your crew chief or supervisor on how to reinforce the anchors.

When selecting locations for anchors, avoid traveled areas and roads. If you cannot avoid these areas, get specific instructions from your supervisor as to what clearance your guy wires and ropes must have over the traveled areas and road.

Clearly mark all guy wires and ropes with the warning flags or signs supplied by your unit. In an emergency, use strips of white cloth as warning streamers.

If you suspect that powerlines have made accidental contact with your antenna, stop operating, rope off the antenna area, and notify your superiors.

If the weather in your area can cause ice to form on your long range antenna and its guy wires and ropes, add extra guys to support the system. Rope off the area and post it with warning signs like "BEWARE OF FALLING ICE."

Do not try to erect any antenna during an electrical storm.

Keep a sharp eye on your anchors and guys. Check them daily and immediately before and after bad weather.

5 SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK

1 DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL

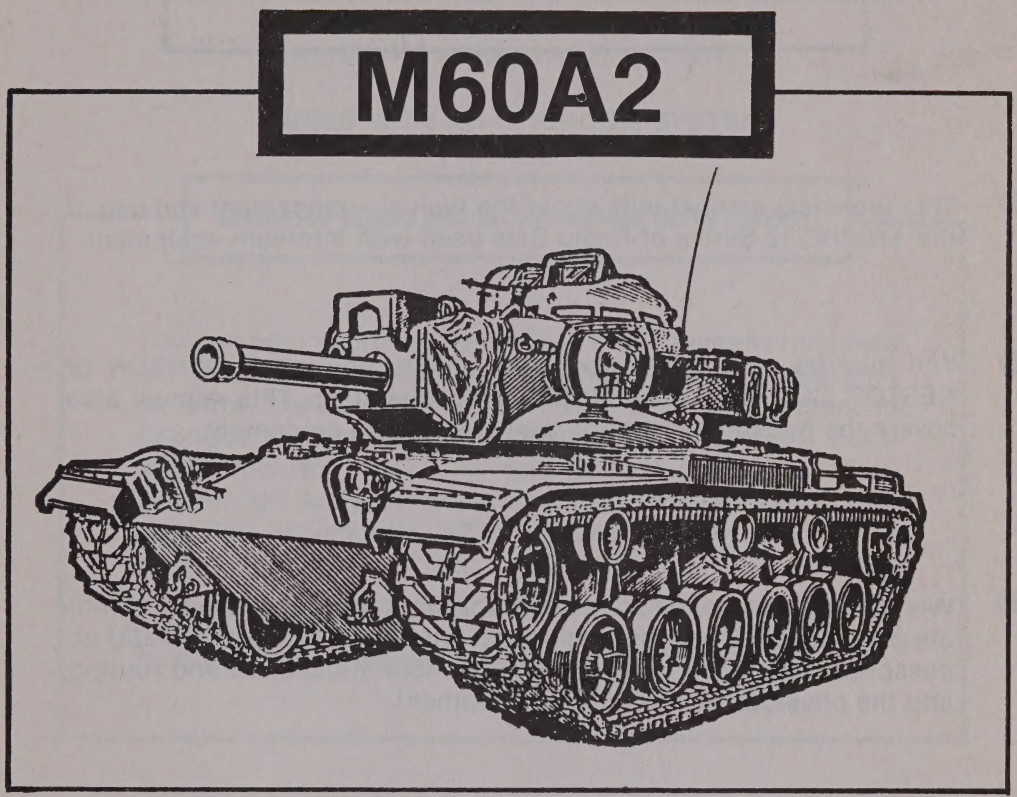
2 IF POSSIBLE, TURN OFF THE ELECTRICAL POWER

3 IF YOU CANNOT TURN OFF THE ELECTRICAL POWER, PULL, PUSH, OR LIFT THE PERSON TO SAFETY USING A WOODEN POLE OR A ROPE OR SOME OTHER INSULATING MATERIAL

4 SEND FOR HELP AS SOON AS POSSIBLE

5 AFTER THE INJURED PERSON IS FREE OF CONTACT WITH THE SOURCE OF ELECTRICAL SHOCK, MOVE THE PERSON A SHORT DISTANCE AWAY AND IMMEDIATELY START ARTIFICIAL RESUSCITATION

WARNING!



ANY TIME RECEIVER-TRANSMITTER (RT-246(*)/VRC OR RT-524(*)/VRC) IS INSTALLED IN M60A2 TANKS, SPECIAL PURPOSE CABLES MUST BE USED TO CONNECT THE RECEIVER-TRANSMITTER TO ITS ANTENNA.

DO NOT USE STANDARD CABLES IN THE M60A2 TANK. SERIOUS INJURY OR EVEN DEATH CAN OCCUR BECAUSE THE STANDARD CABLES RADIATE UNDESIRABLE SIGNALS THAT COULD CAUSE THE MAIN TURRET AND/OR THE TANK COMMANDER'S CUPOLA AND/OR THE MAIN GUN TO MOVE VIOLENTLY.

HOW TO USE THIS MANUAL

- This technical manual tells about the typical arrangement and use of the AN/VRC-12 Series of Radio Sets used with intercom equipment.

- You may be required to use voice secure equipment (VINSON or NESTOR COMSEC EQUIPMENT) while operating. This manual also covers the hookup and use of the voice secure equipment.

- While using this manual, remember that your mission and type of vehicle or installation will determine the types and number of audio accessories authorized, antennas used, cable installation and routing, and the physical location of the equipment.

- The appendices in the back of this manual list the various components that can be used with this equipment. Use the Department of Army Supply Bulletins to identify the various harnesses, installation kits and accessory kits authorized for your installation.

- As an aid while you are inventorying or transferring your equipment, use a copy of the proper hand receipt in HAND RECEIPT Technical Manual TM 11-5820-401-10-2-HR.

*TM 11-5820-401-10-2

TECHNICAL MANUAL

HEADQUARTERS
DEPARTMENT OF THE ARMY

No. 11-5820-401-10-2

Washington, DC, 23 November 1982

Operator's Manual

RADIO SETS
AN/VRC-12 (NSN 5820-00-223-7412), AN/VRC-43 (NSN 5820-00-223-7415), AN/VRC-44 (NSN 5820-00-223-7417), AN/VRC-45 (NSN 5820-00-223-7418), AN/VRC-46 (NSN 5820-00-223-7433), AN/VRC-47 (NSN 5820-00-223-7434), AN/VRC-48 (NSN 5820-00-223-7435), AND AN/VRC-49 (NSN 5820-00-223-7437)

(USED WITH AN INTERCOM SYSTEM)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in back of this manual direct to: Commander, US Army Communications-Electronics Command, and Fort Monmouth, ATTN: DRSEL-ME-MP, Fort Monmouth, New Jersey 07703.

In either case, a reply will be furnished direct to you.

This Manual Supersedes TM 11-5820-401-10-2, 30 December 1977, including all changes.

- EQUIPMENT SERVICEABILITY CRITERIA, TM's:
  - * 11-5820-401-ESC-2, 29 May 1975.
  - * 11-5820-401-ESC-3, 29 May 1975.
  - * 11-5820-401-ESC-4, 28 May 1975.
  - * 11-5820-401-ESC-5, 29 May 1975.

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CHAPTER 1
INTRODUCTION

Section I. GENERAL INFORMATION

1-1. SCOPE

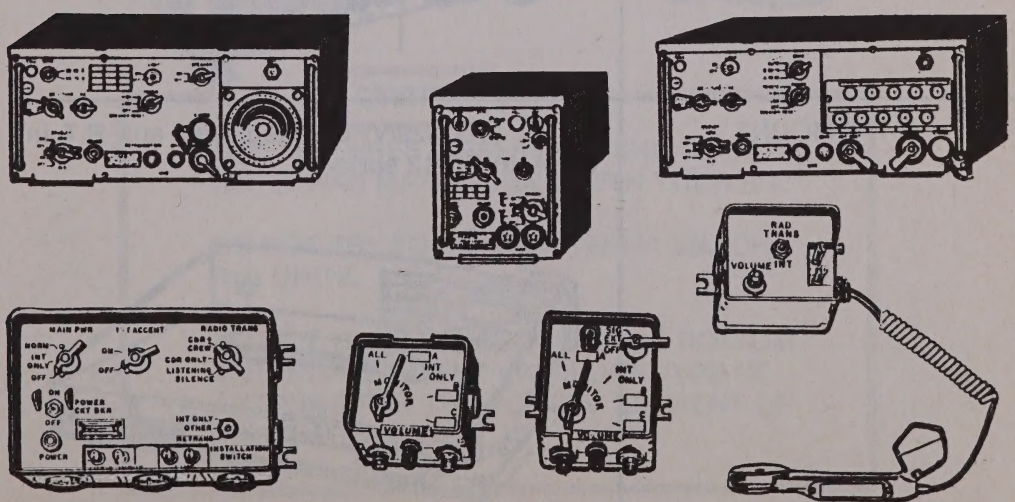
- The purpose of this manual is to tell you how to operate and maintain the AN/VRC-12 Series of Radio Sets that are used with intercom systems.

- The AN/VRC-12 Series of Radio Sets with intercom systems makeup many different types of communication systems used in armored personnel carriers, tanks and other crew operated equipment.

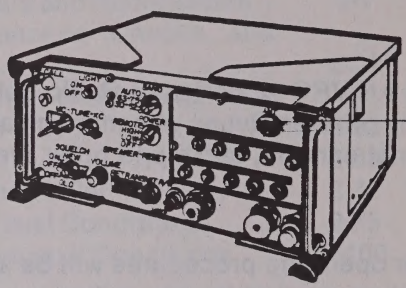
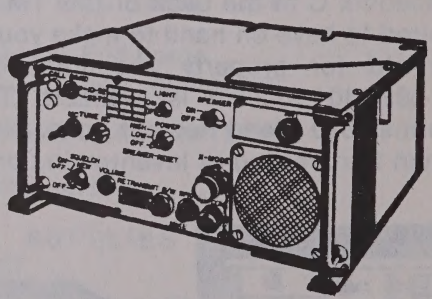
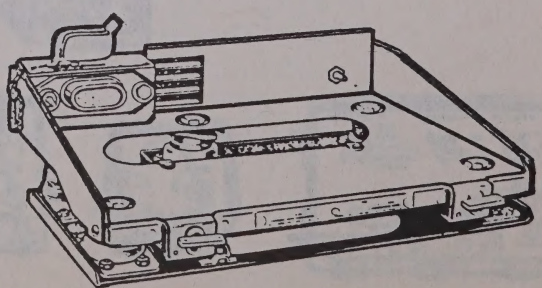
- Your operating procedures will be affected by the voice secure equipment connected to your radios.

- Another Technical Manual 11-5820-401-10-1 covers the AN/VRC-12 Series of Radio Sets used without intercom systems.

- Appendix C in the back of this TM lists additional items you are required to have on hand to make your radio-intercom system work. As an aid for property accountability, Hand Receipt Manual, TM 11-5820-401-10-2-HR is available. This TM contains preprinted DA Forms 2620 (Hand Receipt/Annex No.). Use copies of the proper form when transferring or inventorying property.

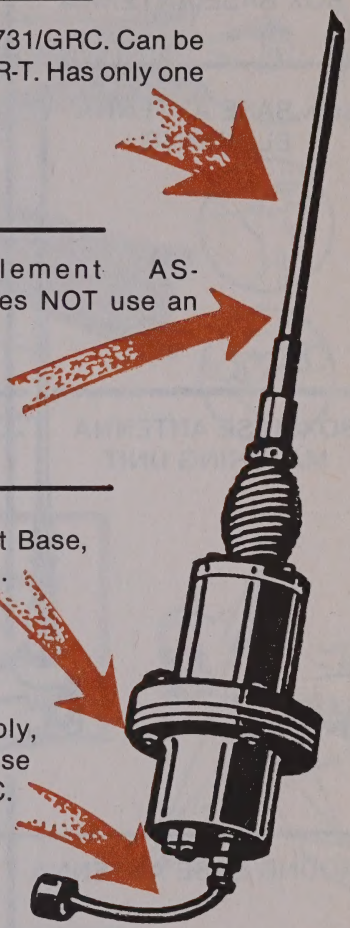


1-2. NOMENCLATURE CROSS REFERENCE LIST

COMMON NAME	OFFICIAL NOMENCLATURE AND GENERAL APPLICATION
AN/VRC-12 SERIES OF RADIO SETS	Radio Sets AN/VRC-12, AN/VRC-43 through -49.
PUSHBUTTON RECEIVER-TRANSMITTER OR R-T	Receiver-Transmitter RT-246(*)/VRC used with AN/VRC-12, AN/VRC-43, AN/VRC-44 and AN/VRC-45. 
R-T OR RECEIVER-TRANSMITTER WITH SPEAKER	Receiver-Transmitter RT-524(*)/VRC used with AN/VRC-46, AN/VRC-47, AN/VRC-48 and AN/VRC-49. Has a built-in loudspeaker in place of pushbuttons. 
R-T MOUNT	Mount MT-1029/VRC. Used with any R-T in the AN/VRC-12 series. 

1-2. NOMENCLATURE CROSS REFERENCE LIST - Continued

COMMON NAME	OFFICIAL NOMENCLATURE AND GENERAL APPLICATION
COMPACT ANTENNA	Antenna AS-2731/GRC. Can be used with any R-T. Has only one element.
COMPACT ANTENNA ELEMENT	Antenna Element AS-2732/GRC. Does NOT use an antenna tip cap.
COMPACT ANTENNA MATCHING UNIT	Matching Unit Base, MX-9146/GRC.
COMPACT ANTENNA ADAPTER CABLE	Cable Assembly, Special Purpose CX-13055/GRC.



CAUTION

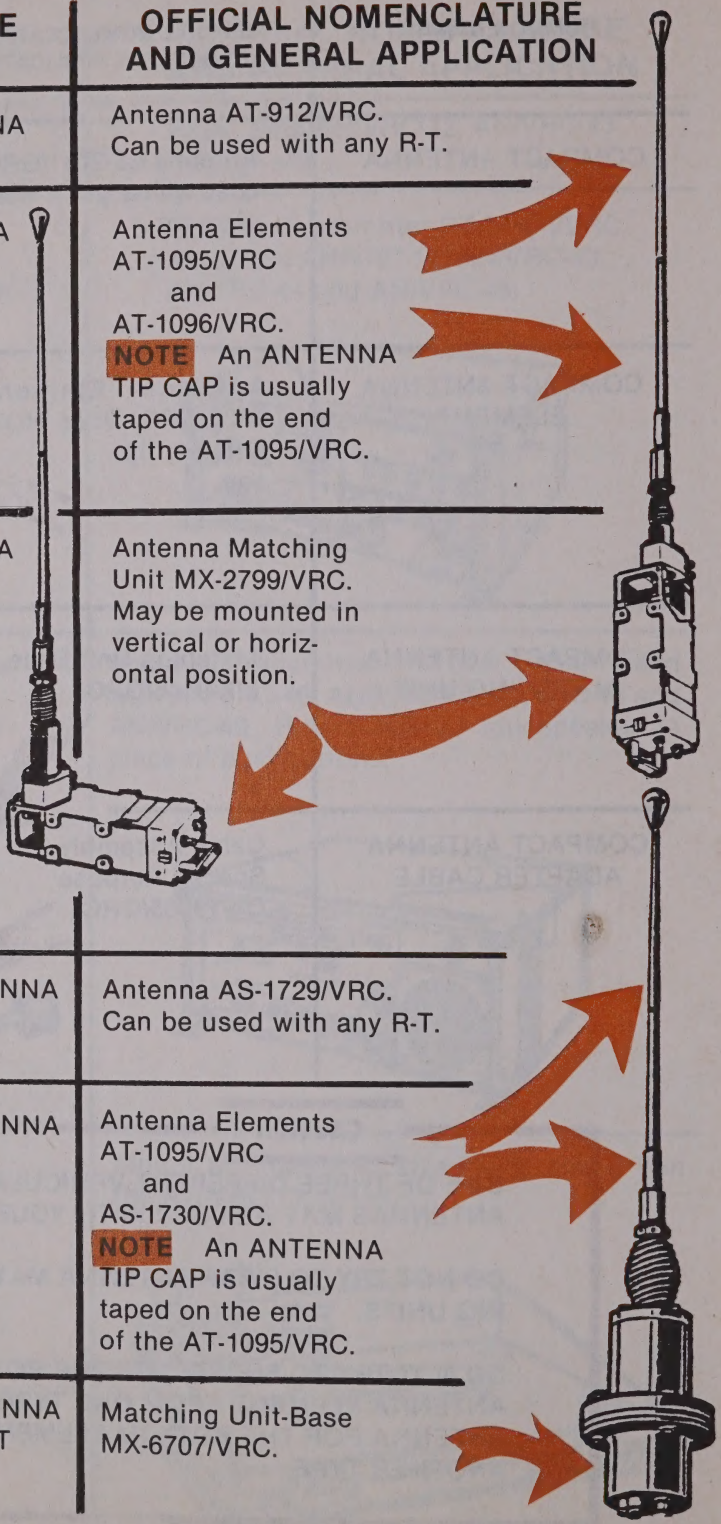
ONE OF THREE DIFFERENT VEHICULAR ANTENNAS MAY BE USED WITH YOUR R-T.

DO NOT TRY TO SWAP ANTENNA MATCHING UNITS.

DO NOT TRY TO SUBSTITUTE THE BOTTOM ANTENNA ELEMENT FROM ONE TYPE OF ANTENNA FOR THE BOTTOM ELEMENT OF ANOTHER TYPE.

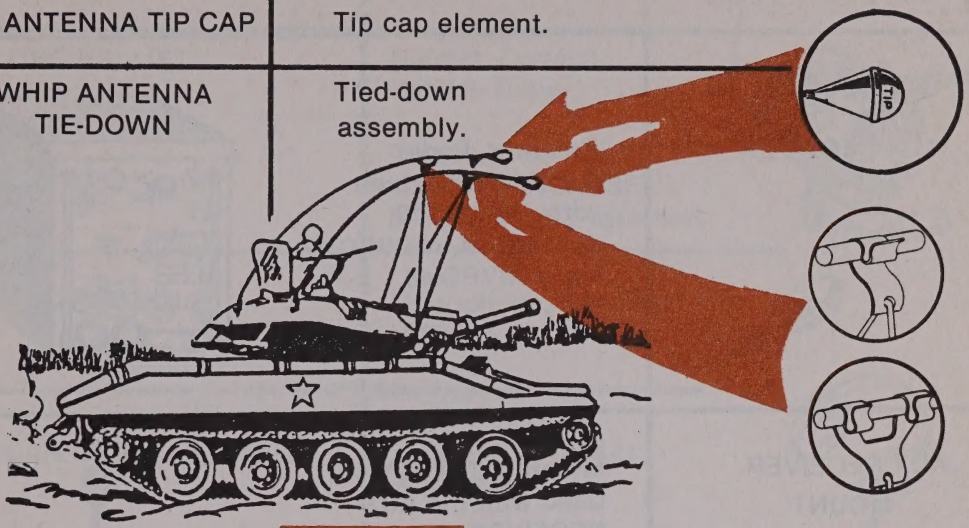
1-2. NOMENCLATURE CROSS REFERENCE LIST - Continued

COMMON NAME	OFFICIAL NOMENCLATURE AND GENERAL APPLICATION
BOX BASE ANTENNA	Antenna AT-912/VRC. Can be used with any R-T.
BOX BASE ANTENNA ELEMENTS	Antenna Elements AT-1095/VRC and AT-1096/VRC. NOTE An ANTENNA TIP CAP is usually taped on the end of the AT-1095/VRC.
BOX BASE ANTENNA MATCHING UNIT	Antenna Matching Unit MX-2799/VRC. May be mounted in vertical or horiz-ontal position.
ROUND BASE ANTENNA	Antenna AS-1729/VRC. Can be used with any R-T.
ROUND BASE ANTENNA ELEMENTS	Antenna Elements AT-1095/VRC and AS-1730/VRC. NOTE An ANTENNA TIP CAP is usually taped on the end of the AT-1095/VRC.
ROUND BASE ANTENNA MATCHING UNIT	Matching Unit-Base MX-6707/VRC.



1-2. NOMENCLATURE CROSS REFERENCE LIST - Continued

COMMON NAME	OFFICIAL NOMENCLATURE AND GENERAL APPLICATIONS
ANTENNA TIP CAP	Tip cap element.
WHIP ANTENNA TIE-DOWN	Tied-down assembly.



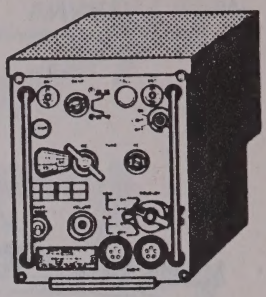
CAUTION

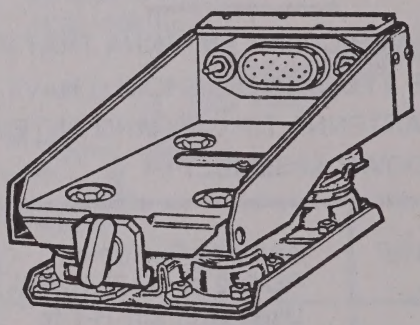
ANY VEHICULAR ANTENNA THAT HAS 2 OR 3 ELEMENTS SHOULD HAVE AN ANTENNA TIP CAP AND ANTENNA TIE-DOWN ASSEMBLY

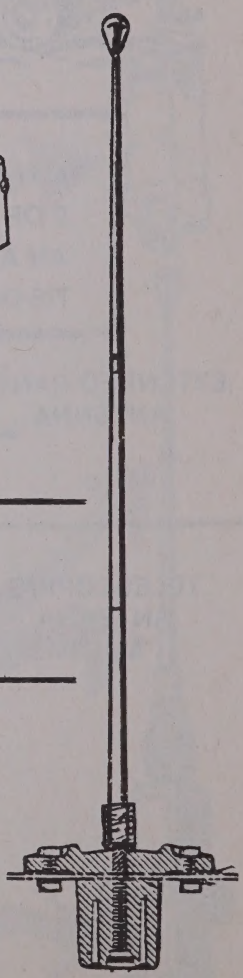
EXTENDED RANGE ANTENNA	Antenna Equipment RC-292 or OE-254/GRC. Used with any R-T to get more range.
TELESCOPING ANTENNA MAST	Mast AB-903/G. Used to raise the COMPACT ANTENNA (AS-2731/GRC) OR the ROUND BASE ANTENNA (AS-1729/VRC) high above the ground.

1-2. NOMENCLATURE CROSS REFERENCE LIST - Continued

COMMON NAME	OFFICIAL NOMENCLATURE AND GENERAL APPLICATION
08 1007 1200	
10 1205 1200 AUX RECEIVER	Receiver, Radio R-442(*)/VRC. Used with AN/VRC-12, AN/VRC-44, AN/VRC-47 and AN/VRC-48.
AUX RECEIVER MOUNT	Mount MT-1898/VRC. Used with the AUX RECEIVER.
AUX RECEIVER ANTENNA	Mast Base AB-15/GR or Mast Base AB-558/GR with 3 antenna elements.
AUX RECEIVER ANTENNA ELEMENTS	Antenna elements MS-116A, MS-117A and MS-118A.



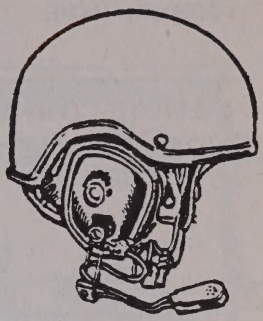
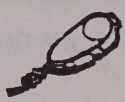
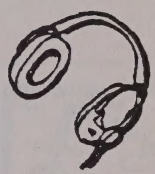
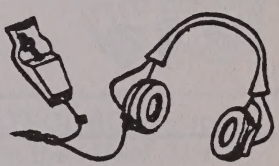




NOTE

The AUX RECEIVER ANTENNA uses 3 elements. It also needs an ANTENNA TIP CAP and a WHIP ANTENNA TIE DOWN.

1-2. NOMENCLATURE CROSS REFERENCE LIST - Continued

COMMON NAME	OFFICIAL NOMENCLATURE AND GENERAL APPLICATION	
CVC HELMET	Helmet, Combat Vehicle Crew. Comes in various sizes with HEADSET-MICROPHONE attached.	
MICROPHONE	Microphone, Dynamic M-80/U.	
EARPHONE HEADSET	Headset H-140A/U or H-251/U.	
COMBINATION HEADSET	Headset Microphone H-161/U.	
HANDSET	Handset H-189/GR or H-250.	
LOUDSPEAKER	Loudspeaker LS-454/U.	

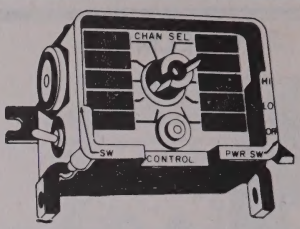
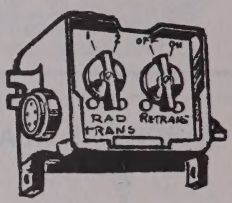
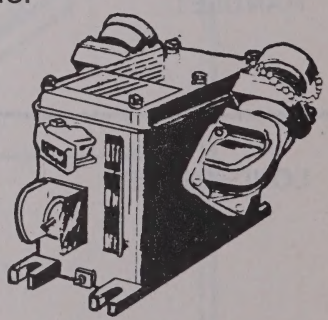
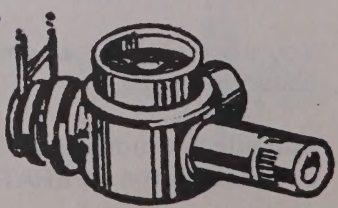
NOTE

The above audio accessories may be connected in many ways to your R-T and intercom equipment.

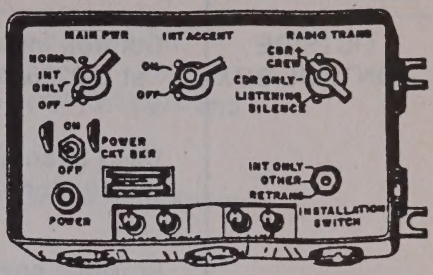
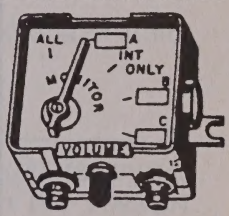
You also will find single or double cables for connecting some audio accessories.

Specific instructions for connecting and using these audio accessories will be found in the OPERATION UNDER USUAL CONDITIONS section.

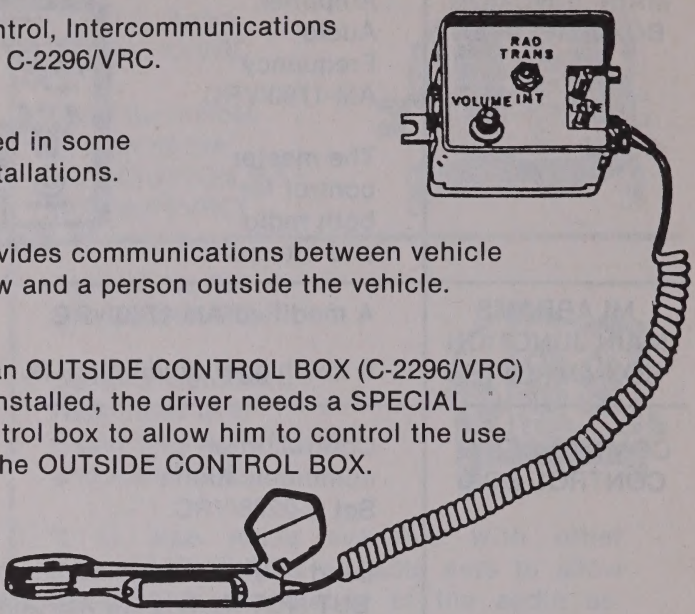
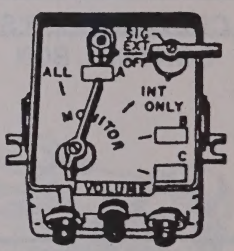
1-2. NOMENCLATURE CROSS REFERENCE LIST - Continued

COMMON NAME	OFFICIAL NOMENCLATURE AND GENERAL APPLICATION
REMOTE CONTROL BOX	Control, Radio Set C-2742/VRC. Used for remote control of the PUSHBUTTON R-T. (RT-246(*)/VRC) 
RADIO RELAY BOX	Control, Radio Set C-2299/VRC. Used for automatic radio relay with Radio Sets AN/VRC-45 and AN/VRC-49.  It is also made available with other AN/VRC-12 SERIES of radio sets to allow convenient connections of the audio accessories to an R-T.
SUPPRESSOR	Suppressor, Electrical Transient MX-7778B/GRC. A large electronic unit used to protect the electronic equipment from being damaged by unusual output from the vehicle battery-charging system. 
MINI-SUPPRESSOR	Suppressor, Electrical Transient MK-2096/GRC A very small unit used in special applications in place of the MX-7778B/GRC It is connected directly to either the R-T or AUX RECEIVER MOUNT. 

1-2. NOMENCLATURE CROSS REFERENCE LIST - Continued

COMMON NAME	OFFICIAL NOMENCLATURE AND GENERAL APPLICATION
MAIN JUNCTION BOX-AMPLIFIER	Amplifier, Audio Frequency AM-1780/VRC. The master control for both radio and intercom. 
M1 ABRAMS MAIN JUNCTION BOX-AMPLIFIER	A modified AM-1780/VRC. It has bigger binding posts.
COMMANDER'S CONTROL BOX	Control, Intercommunications Set C-2298/VRC. Used in all Intercom hookups BUT NOT IN THE M1 ABRAMS. 
CREWMEMBER'S CONTROL BOX	When a CREWMEMBER'S CONTROL BOX is connected to a special receptacle on the MAIN JUNCTION BOX-AMPLIFIER, it becomes a COMMANDER'S CONTROL BOX. In the M1 ABRAMS, a different control box is used to make it a COMMANDER'S CONTROL BOX.
M1 ABRAMS COMMANDER'S CONTROL BOX	Control, Intercommunications Set C-10456(*)/VRC. Used by M1 ABRAMS crewmembers. It is a modified C-2298/VRC. The modification includes a REMOTE receptacle for remote controlling the intercom and radio. If a remote hookup is not used, the REMOTE receptacle must be covered with a shorting cap.
M1 ABRAMS CREWMEMBER'S CONTROL BOX	When the M1 ABRAMS CREWMEMBER'S CONTROL BOX is connected to a special receptacle on the MAIN JUNCTION BOX-AMPLIFIER, it becomes the M1 ABRAMS COMMANDER'S CONTROL BOX.

1-2. NOMENCLATURE CROSS REFERENCE LIST - Continued

COMMON NAME	OFFICIAL NOMENCLATURE AND GENERAL APPLICATION
OUTSIDE CONTROL BOX	Control, Intercommunications Set C-2296/VRC. Used in some installations. Provides communications between vehicle crew and a person outside the vehicle. IF an OUTSIDE CONTROL BOX (C-2296/VRC) is installed, the driver needs a SPECIAL control box to allow him to control the use of the OUTSIDE CONTROL BOX. 
DRIVER'S CONTROL BOX (USED WITH OUTSIDE CONTROL BOX)	Control, Intercommunication Set C-2297/VRC. Required when the vehicle has an OUTSIDE CONTROL BOX.  The DRIVER'S CONTROL BOX allows the driver to communicate with the person outside the vehicle, to connect the person outside the vehicle to the intercom system so he can talk to the crew; connects the person outside the vehicle to the radio set.
INTERCOM SET	Intercommunication Set AN/VIC-1(*). Uses the intercom components described in this technical manual.

1-2. NOMENCLATURE CROSS REFERENCE LIST - Continued

COMMON NAME	OFFICIAL NOMENCLATURE AND GENERAL APPLICATION
VINSON COMSEC EQUIPMENT	TSEC/KY-57 voice secure equipment. Includes Power Supply HYP-57/TSEC and Mount MT-4626/VRC. This is the latest voice-secure equipment in the field.
VINSON R-T MOUNT	The standard R-T MOUNT (MT-1029/VRC) which has been modified to work with the VINSON COMSEC equipment. Modification includes the permanent addition of Junction Box J-3513/U to the R-T MOUNT.
VINSON AUX RECEIVER MOUNT	The standard AUX RECEIVER MOUNT (MT-1898/VRC) which has been modified to work with the VINSON COMSEC equipment. Modification includes the permanent addition of Junction Box J-3514/U to the AUX RECEIVER MOUNT.
VINSON RELAY BOX	Control, Retransmission C-10734/VRC. When VINSON COMSEC equipment is involved in a radio relay (retransmission) hookup of the AN/VRC-45 or AN/VRC-49, the VINSON RELAY BOX is used in place of the standard RADIO RELAY BOX (C-2299/VRC).
VINSON SWITCH BOX	Switch, Audio Frequency SA-2171/VRC. Used when one VINSON COMSEC equipment is to be switched from one R-T to an AUX RECEIVER.
NESTOR COMSEC EQUIPMENT	TSEC/KY-38 voice secure equipment. An early model of voice-secure equipment.

1-2. NOMENCLATURE CROSS REFERENCE LIST - Continued

COMMON NAME	OFFICIAL NOMENCLATURE AND GENERAL APPLICATION
AUTHORIZED RADIO/INTERCOM INSTALLATION HARNESS	Includes cables, mounts (example = R-T MOUNT), control boxes (example = RADIO RELAY BOX), and the entire INTERCOM SET AN/VIC-1. All items in the AUTHORIZED RADIO/INTERCOM INSTALLATION HARNESS stay with the tracked vehicle, even if the tracked vehicle is turned in.
AUTHORIZED RADIO ACCESSORY KIT	Includes the necessary microphones, loudspeakers, headsets, handsets, AUX RECEIVER ANTENNA, etc. All items in the AUTHORIZED RADIO ACCESSORY KIT are removed from the tracked vehicle before the tracked vehicle is turned in.
AUTHORIZED RADIO/ INTERCOM INSTALLATION ACCESSORY KIT (IT WAS CALLED COMBINATION KIT)	Includes all the cables, audio accessories and other items needed when another radio is to be installed in a tracked vehicle. All items in the AUTHORIZED RADIO/INTERCOM INSTALLATION ACCESSORY KIT are removed from the tracked vehicle before the tracked vehicle is turned in.
AUTHORIZED COMSEC INSTALLATION KIT	Includes cables and hardware needed to install VINSON and NESTOR COMSEC equipment in a tracked vehicle. All items in the AUTHORIZED COMSEC INSTALLATION KIT are removed from the tracked vehicle before the tracked vehicle is turned in.

NOTES

1. The CVC HELMETS and the audio components attached to the helmets are NOT part of any of the above kits. CVC HELMETS and the attached audio accessories are authorized separately. The same applies to AVC HELMETS.

2. Use the ADDITIONAL AUTHORIZATION LIST (appx C) and Department of Army Supply Bulletin 11-131 to identify which kits and components are authorized for the radios in your tracked vehicle.

3. Use Department of the Army Supply Bulletin 11-700 to identify the AUTHORIZED COMSEC INSTALLATION KIT for your tracked vehicle.

1-3. GLOSSARY

CIPHER mode	=	Secure (scrambled) communications using VINSON or NESTOR COMSEC EQUIPMENT.
configuration	=	The arrangement of parts or components.
cryptovariables	=	The classified electronics information fed into VINSON or NESTOR COMSEC equipment to give you secure communications (CIPHER MODE).
NESTOR	=	Early models of COMSEC EQUIPMENT.
RADIO WIRE INTEGRATION	=	Interconnecting radios and telephone signals.
retractile	=	A retractile cable draws itself back to a shorter length when released.
sidetone	=	The sound of your voice in your headset or loudspeaker.
VINSON	=	The latest model of COMSEC EQUIPMENT.

1-4. LIST OF ABBREVIATIONS AND SYMBOLS

ac	alternating current
am	amplitude modulation
ASC	Area Signal Center
CEOI	Communications Electronics Operation Instructions
C-E ORG MAINT	Communications-Electronics Organizational Maintenance.
dc	direct current
Hz	Hertz
kHz (was KC)	kiloHertz
mHz (was KC)	megaHertz
rf	radio frequency
RWI	Radio Wire Integration
M1 ABRAMS	Tank, Combat, full-tracked, 105-MM Gun, M1 ABRAMS
X-MODE	Voice secure or digital radio communications
(*)	This symbol means all models of the equipment.

1-5. MAINTENANCE FORMS AND RECORDS

Department of Army forms and procedures used for equipment maintenance will be those prescribed by TM 38-750, The Army Maintenance Management System (TAMMS).

1-6. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE

Refer to TM 750-244-2 for proper procedures for destruction of this equipment to prevent enemy use.

1-7. PREPARATION FOR STORAGE OR SHIPMENT

The storage and shipment of these radio sets must be carefully done. Complete instructions will be found in Chapter 3 in this manual.

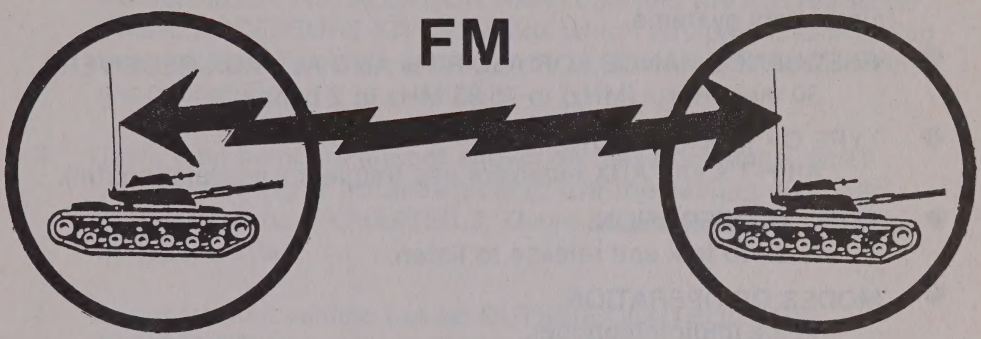
1-8. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

If your AN/VRC-12 Series of Radio Sets need improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Put it on an SF 368 (Quality Deficiency Report). Mail it to Commander, US Army Communications-Electronics Command, and Fort Monmouth, ATTN: DRSEL-ME-MP, Fort Monmouth, New Jersey 07703. We'll send you a reply.

SECTION II.
EQUIPMENT DESCRIPTION

1-9. PURPOSE, CAPABILITIES AND FEATURES OF AN/VRC-12 SERIES OF RADIO SETS

- Used to provide short range, two way radio voice communications between vehicles.



- Frequency modulation (fm) type of radio sets.
- Transmit and receive in the frequency range of 30 mHz to 75.95 mHz.
- Range and type of operation may require different antennas.
- Components of this series of radio sets can be hooked-up to make-up radio relay sets or remote controlled radio sets or RWI.
- When authorized, secure voice communications or digital data transmission can be provided (X-MODE).
- This series includes Radio Sets:

AN/VRC-12	AN/VRC-46
AN/VRC-43	AN/VRC-47
AN/VRC-44	AN/VRC-48
AN/VRC-45	AN/VRC-49.

All of these radio sets can be used with the AN/VIC-1.

- The AN/VRC-46 and AN/VRC-49 are most common in the RWI, remote control and retransmission hook ups, BUT, the other sets can be used.

1-10. PERFORMANCE DATA FOR THE AN/VRC-12 SERIES OF RADIO SETS

- TRANSMISSION DISTANCE WITH WHIP ANTENNA.
  LOW POWER: Approximately 5 miles (8 kilometers (km)).
  HIGH POWER: Approximately 25 miles (41 km).
- TRANSMITTER POWER OUTPUT.
  LOW POWER: Approximately 0.5 to 8 watts.
  HIGH POWER: 35 watts minimum.
- OPERATING POWER.
  From the 24-volt vehicle battery system.
  22 to 30 volts dc is the common range of voltages in 24-volt vehicle battery systems.
- FREQUENCY RANGE FOR ALL R-T's AND ALL AUX RECEIVERS.
  30 megaHertz (MHz) to 75.95 MHz in 2 bands.
- TYPE OF MODULATION.
  All R-T's and AUX receivers use frequency modulation (fm).
- TYPE OF OPERATION.
  Push to talk and release to listen.
- MODES OF OPERATION.
  Voice (radiotelephone).
  Retransmission (radio relay).
  X-mode (secure voice or digital data).
- TUNING THE AUX RECEIVERS.
  All AUX receivers are manually tuned using knobs.
- TUNING THE RT-524(*)/VRC.
  This R-T is manually tuned using knobs.
- TUNING THE RT-246(*)/VRC.
  Can be manually tuned using knobs.

  OR

  Has 10 pushbuttons which you can preset and then select any one of the 10 preset frequencies by pressing the correct pushbutton.

  AND

  Can be remotely tuned to any of the 10 preset frequencies from a remote position by using the REMOTE CONTROL BOX.
- TUNING THE CIRCUITS IN THE BASE OF THE BOX BASE ANTENNA.
  Automatically done when you tune the R-T.
- TUNING THE CIRCUITS IN THE BASE OF THE COMPACT ANTENNA OR THE ROUND BASE ANTENNA.
  Automatically done when you tune the R-T if you have a cable connected from the ANT CONT receptacle on the R-T to the antenna base. BUT - if no cable is used, you must manually tune the antenna by using the 10=position switch located on the under side of the antenna base.

1-11. TYPICAL INSTALLATION OF THE AN/VRC-12 SERIES OF RADIO SETS WITH INTERCOM SET AN/VIC-1 AND COMSEC EQUIPMENT

NOTES:

1. The following drawings show only typical hookups in tracked vehicles.

2. It is not possible to show every hookup that can be made. The AUTHORIZED INSTALLATION HARNESS and the AUTHORIZED RADIO ACCESSORY KIT determine which equipment is installed in your tracked vehicle and how the equipment and accessories are connected.

3. Cable type numbers are not shown on these drawings. When you are cabling or troubleshooting, use the cabling diagrams in SECTION IV of CHAPTER 2. These diagrams identify cables by type number.

4. If your tracked vehicle has an OUTSIDE CONTROL BOX (C-2296/VRC), the driver will need a DRIVER'S CONTROL BOX (C-2297/VRC).

5. If your tracked vehicle DOES NOT HAVE an OUTSIDE CONTROL BOX, the driver will have a regular CREWMEMBER'S CONTROL BOX.

6. ALL tracked vehicles will use a suppressor. Either SUPPRESSOR MX-7777/GRC or the MINI-SUPPRESSOR will be used.

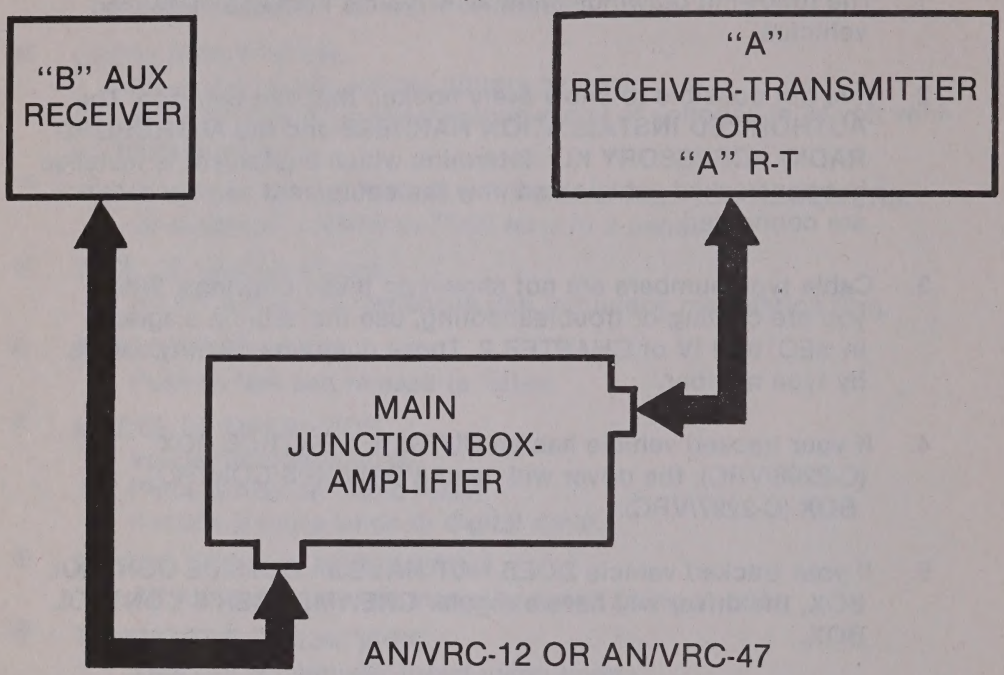
7. ALL radio, intercom and COMSEC equipment in your tracked vehicle receive their power from the vehicle's battery-charging system. The type of equipment-to-power connection is determined by the equipment, type of vehicle and the AUTHORIZED INSTALLATION HARNESS.

8. Because of the large number of possible equipment-to-power connections, it is not practical to show one standard type connection in the following drawings. The drawings will only show that a connection is made to the INSTALLATION or VEHICLE MAIN ELECTRICAL POWER source.

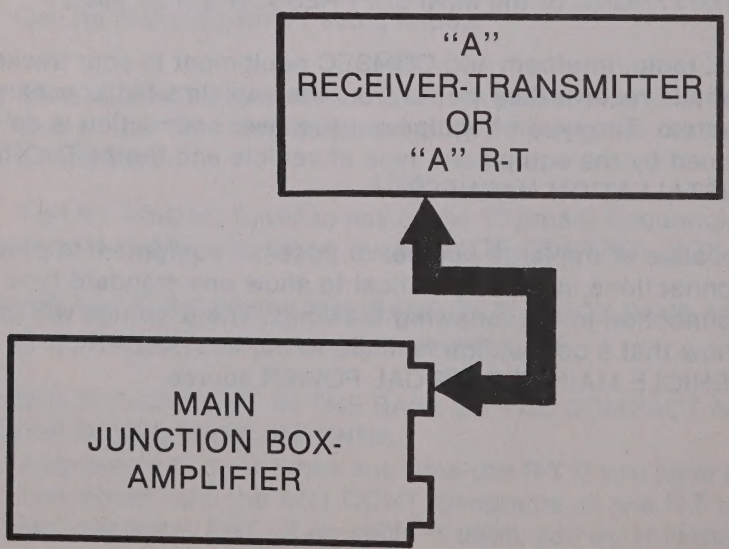
1-12. TYPICAL IDENTIFICATION OF AN/VRC-12 RADIO

NOTES:

1. The terms "A" RECEIVER-TRANSMITTER, "B" AUX RECEIVER etc. are used throughout this manual. These terms refer to equipment connected as shown on these two pages.
2. Refer to the CABLING SECTION (SECTION IV) in this manual for exact cable types and cable connections.

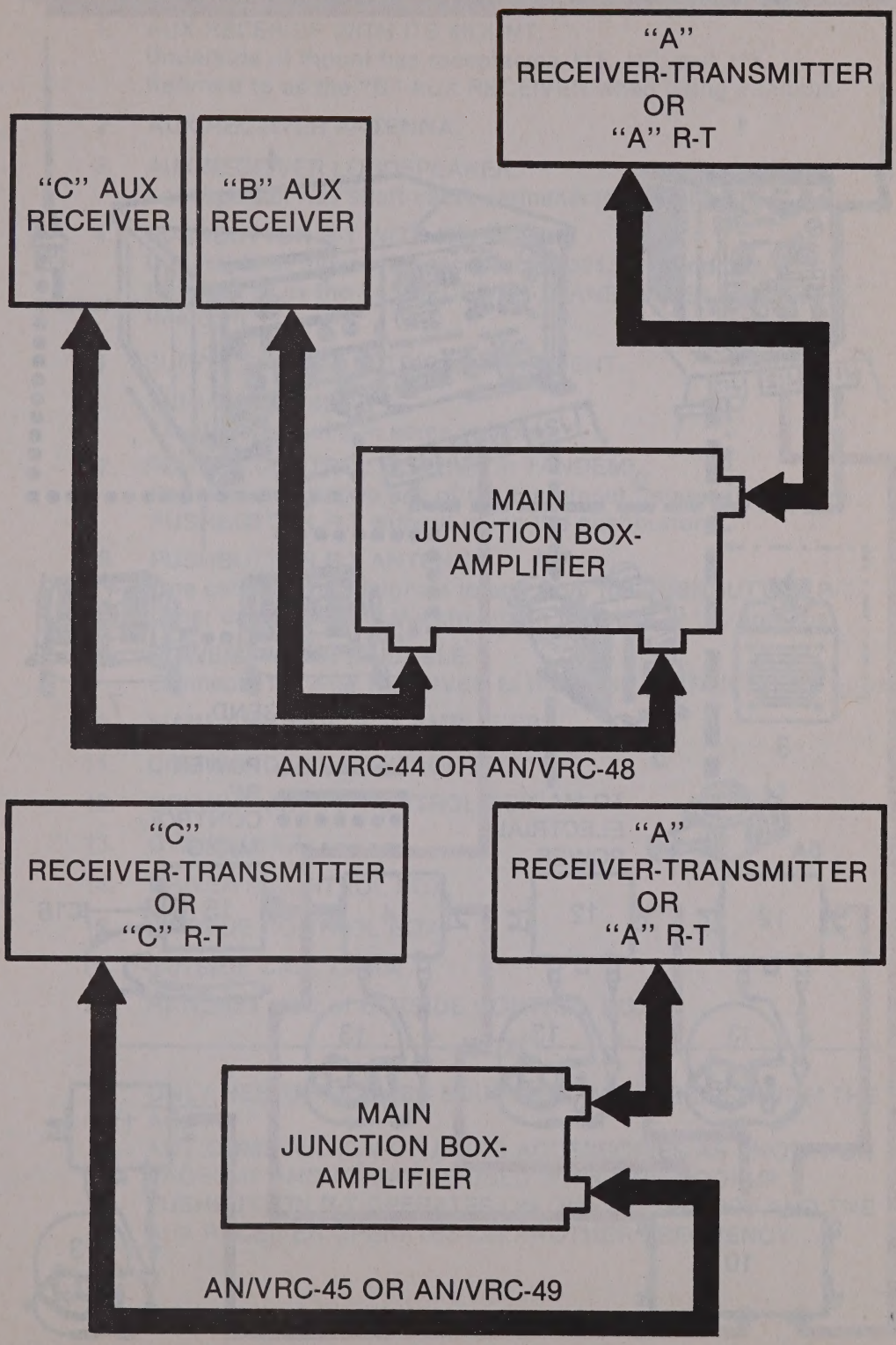


AN/VRC-12 OR AN/VRC-47

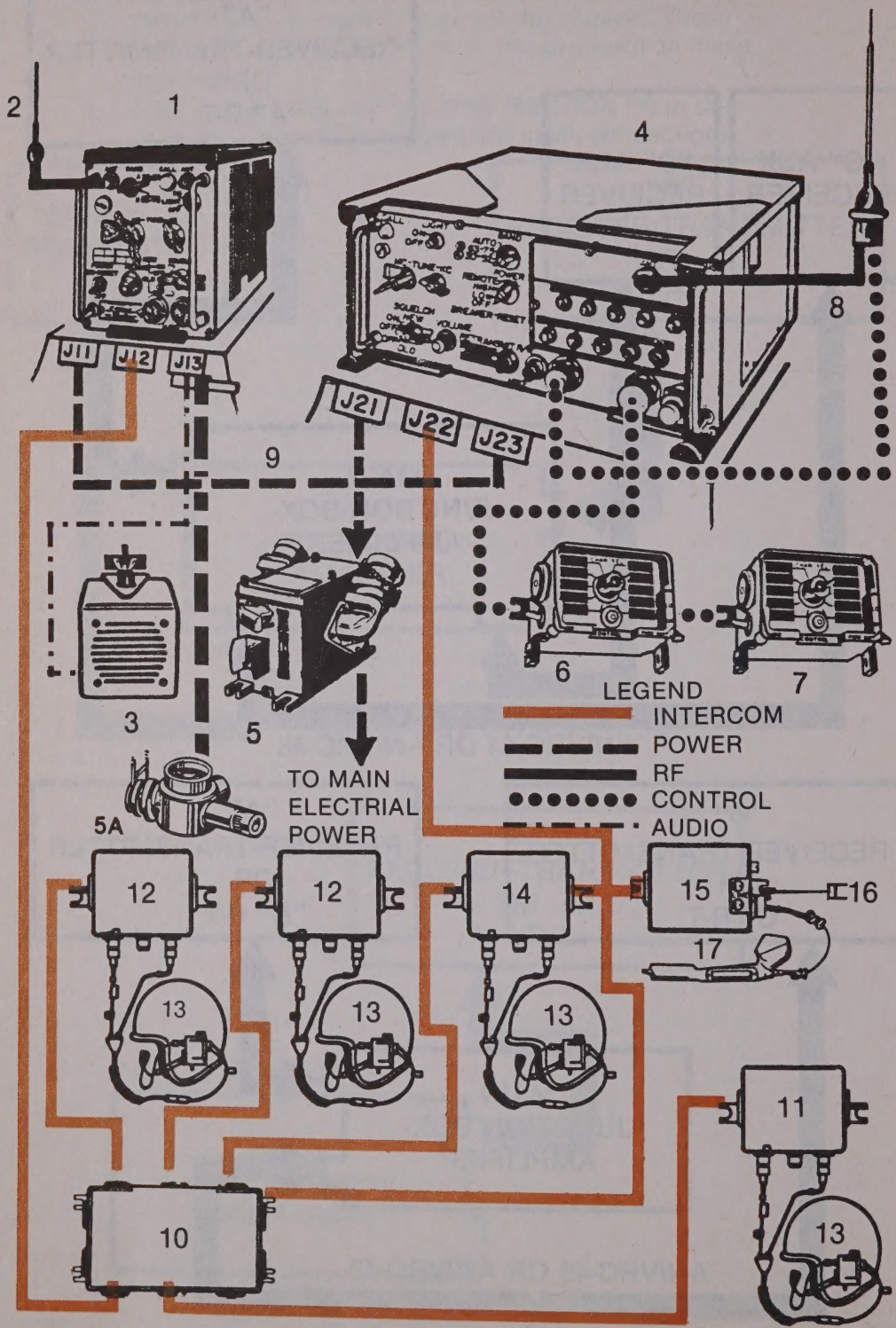


AN/VRC-43 OR AN/VRC-46

COMPONENTS IN INTERCOM HOOKUPS



1-13. TYPICAL LAYOUT OF RADIO SET AN/VRC-12 AND INTERCOM SET



AN/VIC-1 FOR NESTOR COMSEC USE IN A TRACKED VEHICLE.

1. AUX RECEIVER WITH ITS MOUNT.
   Underside of mount has receptacles J11, J12, and J13.
   Referred to as the "B" AUX RECEIVER when using intercom.
2. AUX RECEIVER ANTENNA.
3. AUX RECEIVER LOUDSPEAKER.
   Loudspeaker has short cable permanently attached to it.
4. PUSHBUTTON R-T WITH ITS MOUNT.
   Underside of mount has receptacles J21, J22, and J23.
   Referred to as the "A" RECEIVER-TRANSMITTER when using intercom.
5. SUPPRESSOR, ELECTRICAL TRANSIENT.

5A. MINI-SUPPRESSOR
   Used instead of 5 in some vehicles.

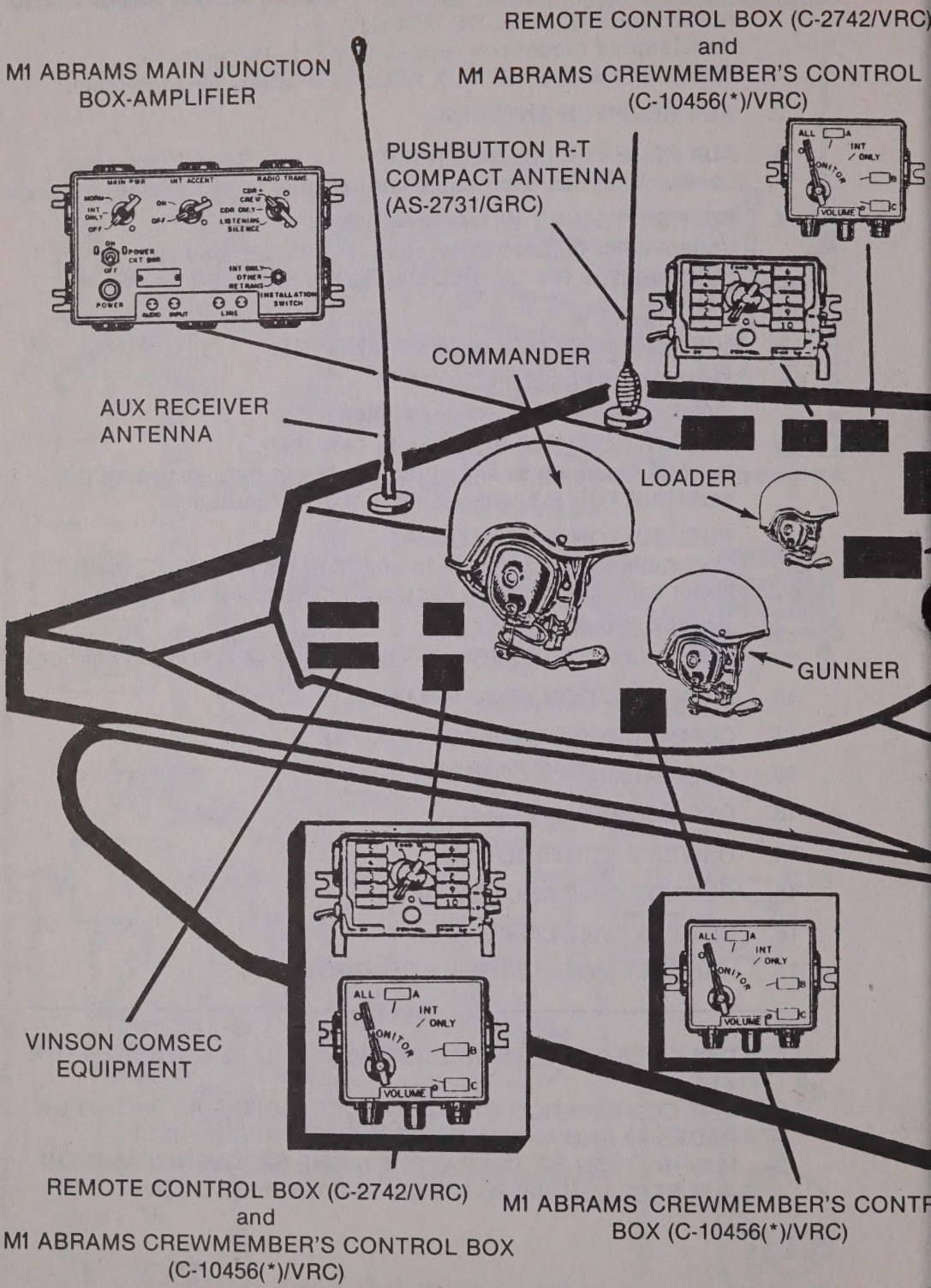
6,7. REMOTE CONTROL BOX (two in TANDEM).
   Permits changing to any of the ten preset frequencies on the PUSHBUTTON R-T without using the pushbuttons.

8. PUSHBUTTON R-T ANTENNA.
   One cable feeds rf signals to and from the PUSHBUTTON R-T.
   Other cable controls the circuits in the base of the antenna.
9. POWER TRANSFER CABLE.
   Connects the AUX RECEIVER to the PUSHBUTTON R-T for power.
10. MAIN JUNCTION BOX-AMPLIFIER.
11. COMMANDER'S CONTROL BOX.
12. CREWMEMBER'S CONTROL BOX.
13. CVC HELMET.
14. DRIVER'S CONTROL BOX.
15. OUTSIDE CONTROL BOX.
16. OUTSIDE CALL LAMP.
17. HANDSET (part of OUTSIDE CONTROL BOX).

NOTES

1. ONLY NESTOR COMSEC EQUIPMENT MAY BE USED WITH THE ABOVE.
2. ANY COMBINATION OF AUDIO ACCESSORIES AS SHOWN ON PAGES 42 AND 43 MAY BE USED WITH THIS HOOKUP.
3. PUSHBUTTON R-T OPERATES ON ONE FREQUENCY AND THE AUX RECEIVER OPERATES ON ANOTHER FREQUENCY.

1-14. TYPICAL LAYOUT OF RADIO SET AN/VRC-12 AND INTERCOM SET



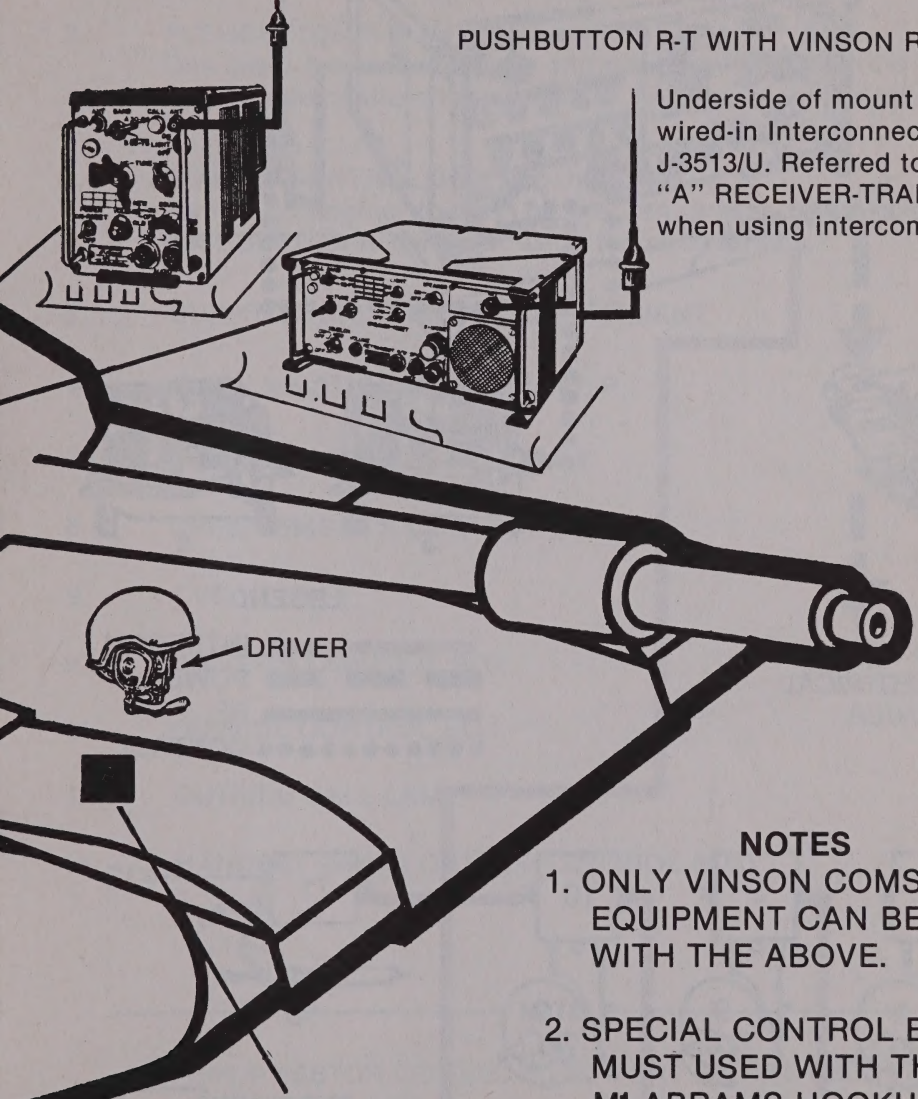
AN/VIC-1 FOR VINSON COMSEC USE IN THE M1 ABRAMS TANK.

AUX RECEIVER WITH VINSON AUX RECEIVER MOUNT.

Underside of mount has MINI-SUPPRESSOR and wired-in Interconnecting Box J-3514/U. Referred to as the "B" AUX RECEIVER when using intercom.

PUSHBUTTON R-T WITH VINSON R-T MOUNT.

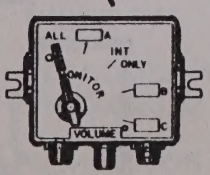
Underside of mount has wired-in Interconnecting Box J-3513/U. Referred to as the "A" RECEIVER-TRANSMITTER when using intercom.



NOTES

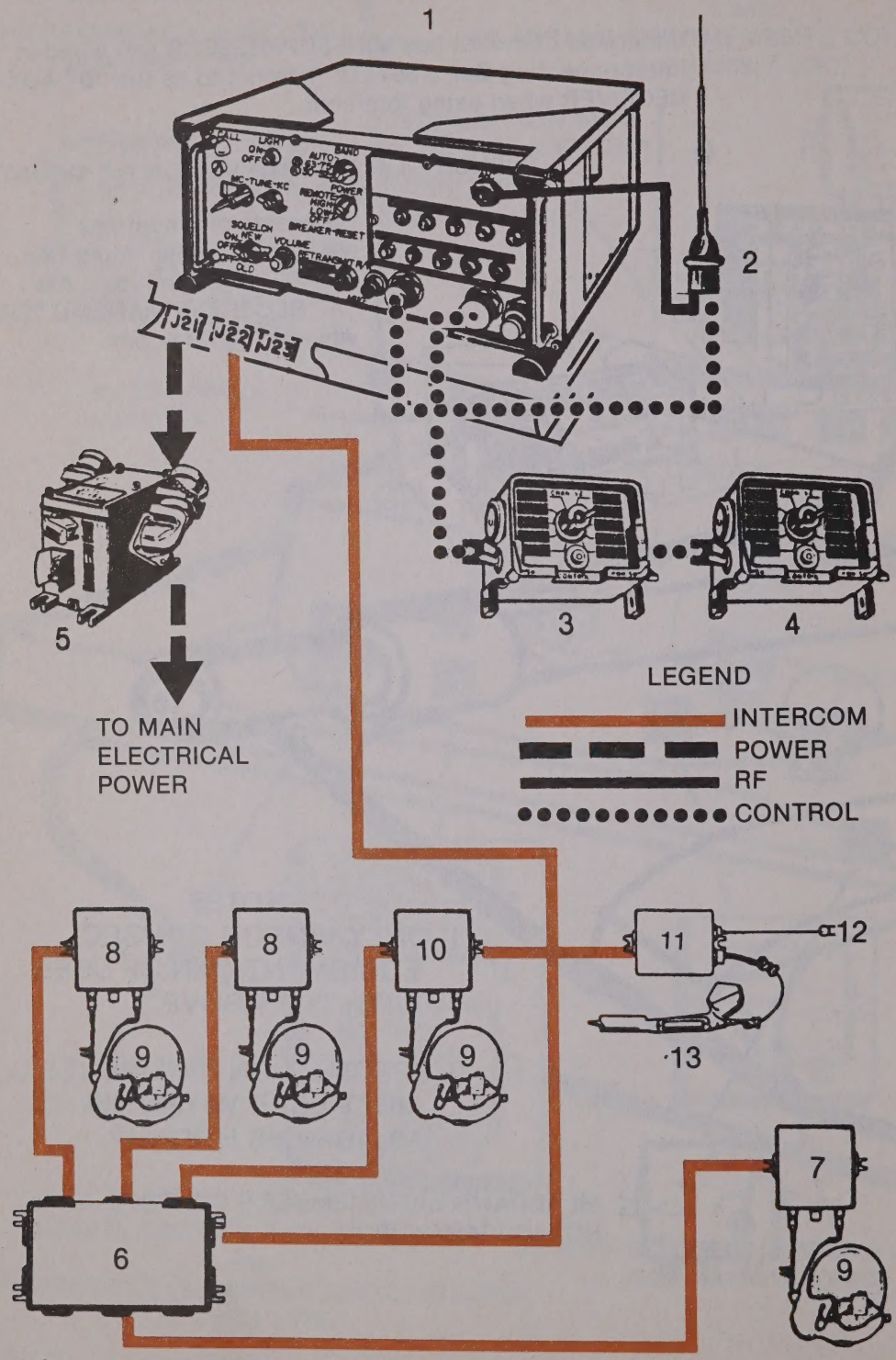
1. ONLY VINSON COMSEC EQUIPMENT CAN BE USED WITH THE ABOVE.

2. SPECIAL CONTROL BOXES MUST USED WITH THIS M1 ABRAMS HOOKUP.



M1 ABRAMS CREWMEMBER'S CONTROL BOX (C-10456(*)/VRC)

1-15. TYPICAL LAYOUT OF RADIO SET AN/VRC-43 AND INTERCOM



SET AN/VIC-1 FOR NESTOR COMSEC USE IN A TRACKED VEHICLE.

1. PUSHBUTTON R-T WITH ITS MOUNT.
Underside of mount has receptacles J21, J22 and J23.
Referred to as the "A" RECEIVER-TRANSMITTER when using intercom.

2. PUSHBUTTON R-T ANTENNA.
One cable feeds rf signals to and from the PUSHBUTTON R-T.
Other cable controls the circuits in the base of the antenna.

3,4. REMOTE CONTROL BOX (two in tandem).
Permits changing to any of the ten preset frequencies on the PUSHBUTTON R-T without using the pushbuttons.

5. SUPPRESSOR, ELECTRICAL TRANSIENT.

6. MAIN JUNCTION BOX-AMPLIFIER.

7. COMMANDER'S CONTROL BOX.

8. CREWMEMBER'S CONTROL BOX.

9. CVC HELMET.

10. DRIVER'S CONTROL BOX.

11. OUTSIDE CONTROL BOX.

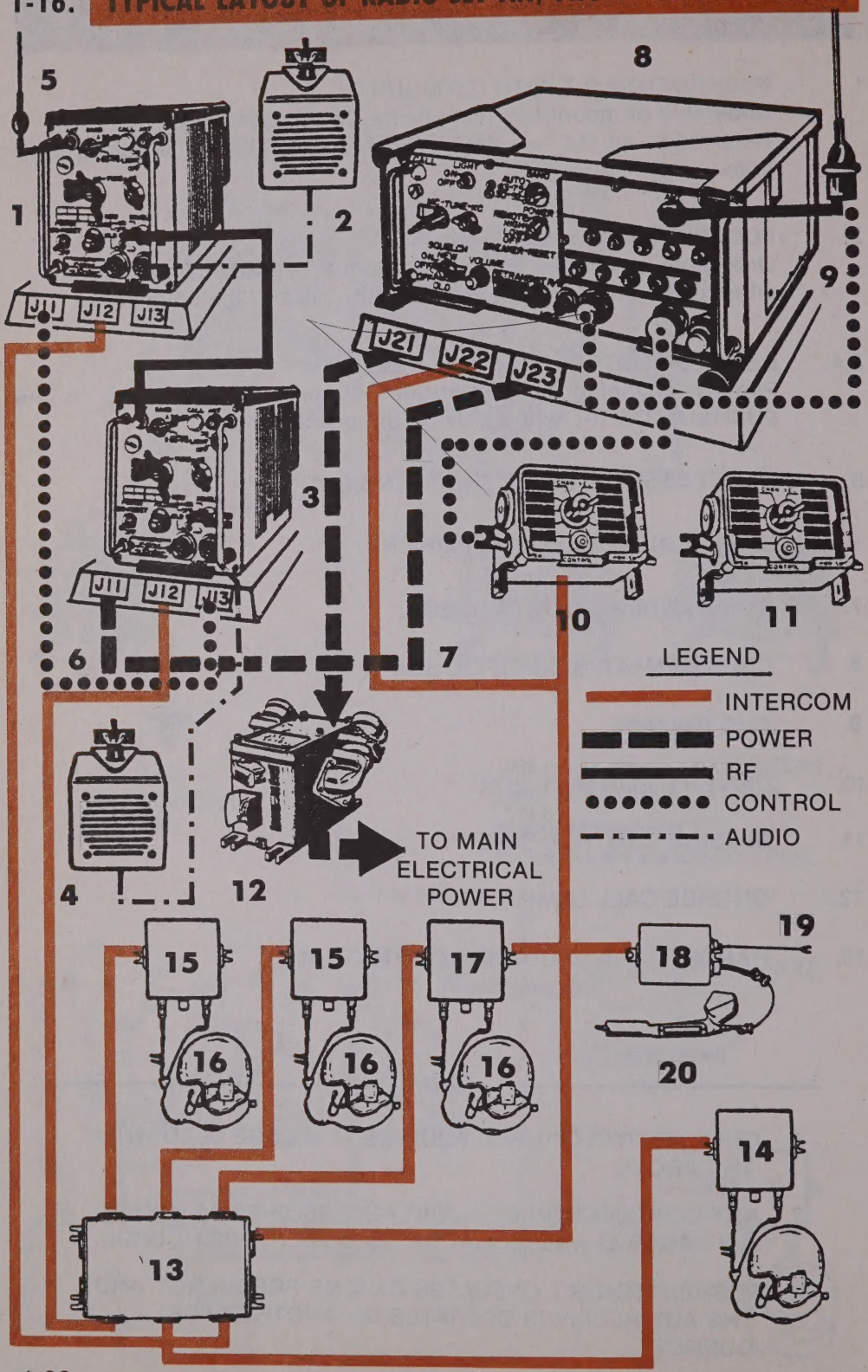
12. OUTSIDE CALL LAMP.

13. HANDSET (part of OUTSIDE CONTROL BOX).

NOTES

1. ONLY NESTOR COMSEC EQUIPMENT MAY BE USED WITH THE ABOVE.
2. ANY COMBINATION OF AUDIO ACCESSORIES AS SHOWN ON PAGES 42 AND 43 MAY BE USED WITH THIS HOOKUP.
3. PUSHBUTTON R-T OPERATES ON ONE FREQUENCY AND THE AUX RECEIVER OPERATES ON ANOTHER FREQUENCY.

1-16. TYPICAL LAYOUT OF RADIO SET AN/VRC-44 AND INTERCOM



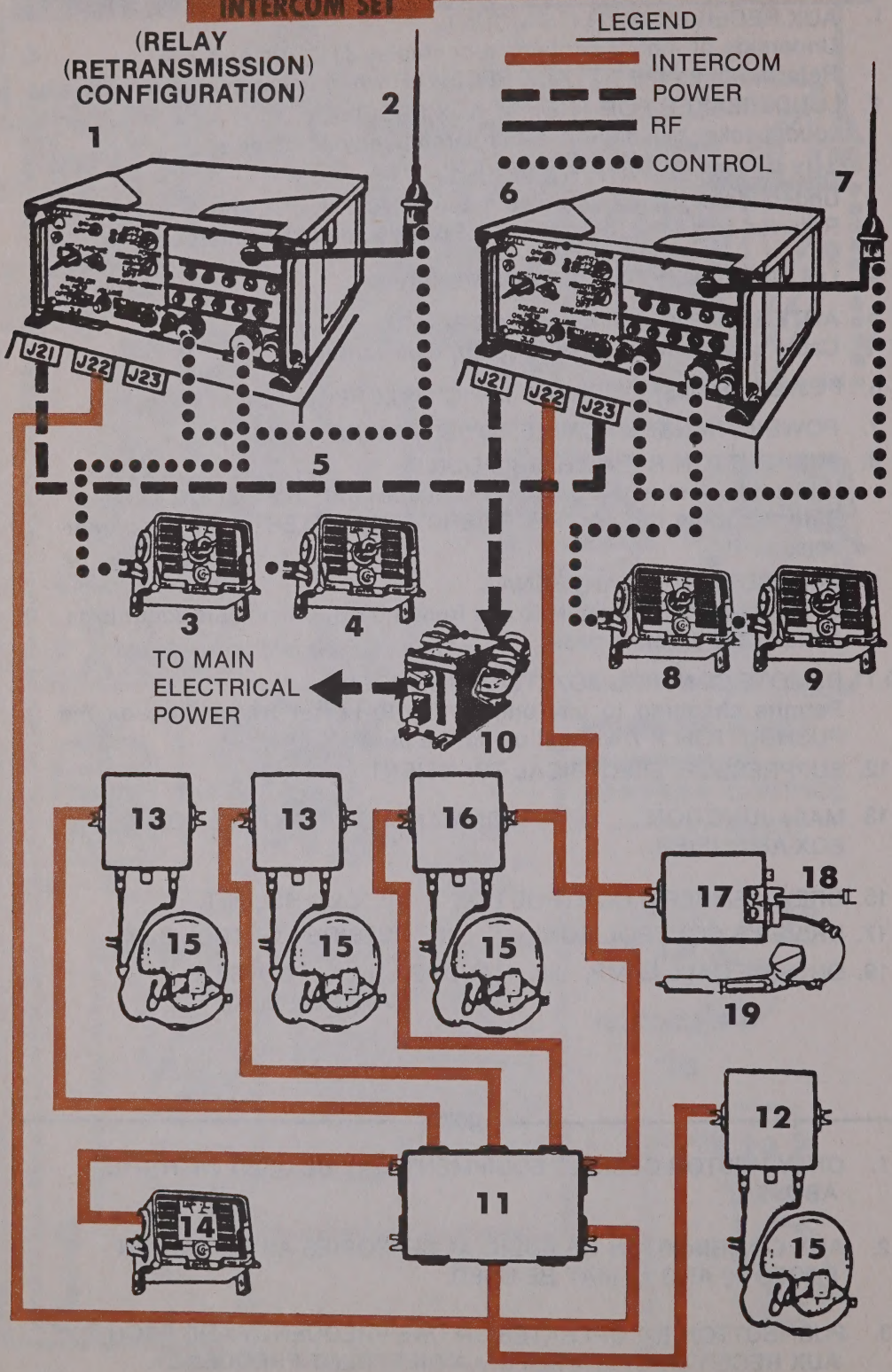
SET AN/VIC-1 FOR NESTOR COMSEC USE IN A TRACKED VEHICLE.

1. AUX RECEIVER WITH ITS MOUNT.
   Underside of mount contains receptacles J11, J12, and J13.
   Referred to as the "C" AUX RECEIVER when using intercom.
2. LOUDSPEAKER FOR THE "C" AUX RECEIVER.
   Loudspeaker has a short cable permanently attached to it.
3. AUX RECEIVER WITH ITS MOUNT.
   Underside of mount contains receptacles J11, J12, and J13.
   Referred to as the "B" AUX RECEIVER when using intercom.
4. LOUDSPEAKER FOR "B" AUX RECEIVER.
5. ANTENNA FOR BOTH AUX RECEIVERS.
   ✱ Cable connections allows sharing same antenna.
6. POWER TRANSFER CABLE TO "C" AUX RECEIVER.
7. POWER TRANSFER CABLE TO "B" AUX RECEIVER.
8. PUSHBUTTON R-T WITH ITS MOUNT.
   Underside of mount contains receptacles J21, J22 and J23.
   Referred to as the "A" RECEIVER-TRANSMITTER when using intercom.
9. PUSHBUTTON R-T ANTENNA.
   One cable feeds rf signals to and from the R-T, other cable controls circuits in the antenna base.
10,11. REMOTE CONTROL BOX (TWO IN TANDEM).
   Permits changing to any one of the 10 preset frequencies on the PUSHBUTTON R-T without using the pushbuttons.
12. SUPPRESSOR, ELECTRICAL TRANSIENT.
13. MAIN JUNCTION BOX-AMPLIFIER.
14. COMMANDER'S CONTROL BOX.
15. CREWMEMBER'S CONTROL BOX.
16. CVC HELMET.
17. DRIVER'S CONTROL BOX.
18. OUTSIDE CONTROL BOX.
19. OUTSIDE CALL LAMP.
20. HANDSET. (part of OUTSIDE CONTROL BOX).

NOTES

1. ONLY NESTOR COMSEC EQUIPMENT MAY BE USED WITH THE ABOVE.
2. ANY COMBINATION OF AUDIO ACCESSORIES AS SHOWN ON PAGES 42 AND 43 MAY BE USED.
3. PUSHBUTTON R-T OPERATES ON ONE FREQUENCY AND EACH AUX RECEIVER OPERATES ON A DIFFERENT FREQUENCY

1-17. TYPICAL LAYOUT OF RADIO SET AN/VRC-45 AND INTERCOM SET



AN/VIC-1 FOR RADIO RELAY OF SIGNALS USING NESTOR COMSEC EQUIPMENT.

1. PUSHBUTTON R-T WITH ITS MOUNT.
Underside of mount contains receptacles J21, J22 and J23.
Referred to as the "C" RECEIVER-TRANSMITTER.

2. ANTENNA FOR THE "C"RECEIVER-TRANSMITTER.
One cable feeds signal to and from the R-T, other cable controls circuits in the antenna base.

3,4. REMOTE CONTROL BOXES (TWO IN TANDEM).
Permits changing to any of the ten preset frequencies on the PUSHBUTTON R-T without using the pushbuttons.

5. POWER TRANSFER CABLE.
Connects the "A" RECEIVER-TRANSMITTER to the "C" RECEIVER-TRANSMITTER for power.

6. PUSHBUTTON R-T WITH ITS MOUNT.
Underside of mount contains receptacles J21, J22 and J23.
Referred to as the "A" RECEIVER-TRANSMITTER.

7. ANTENNA FOR THE "A" RECEIVER-TRANSMITTER.

8,9. REMOTE CONTROL BOXES (TWO IN TANDEM).

10. SUPPRESSOR, ELECTRICAL TRANSIENT.

11. MAIN JUNCTION BOX, AMPLIFIER.

12. COMMANDER'S CONTROL BOX.

13. CREWMEMBER'S CONTROL BOX.

14. RADIO RELAY BOX (C-2299/VRC).

15. CVC HELMET.

16. DRIVER'S CONTROL BOX.

17. OUTSIDE CONTROL BOX.

18. OUTSIDE CALL LAMP.

19. HANDSET (PART OF OUTSIDE CONTROL BOX).

NOTES

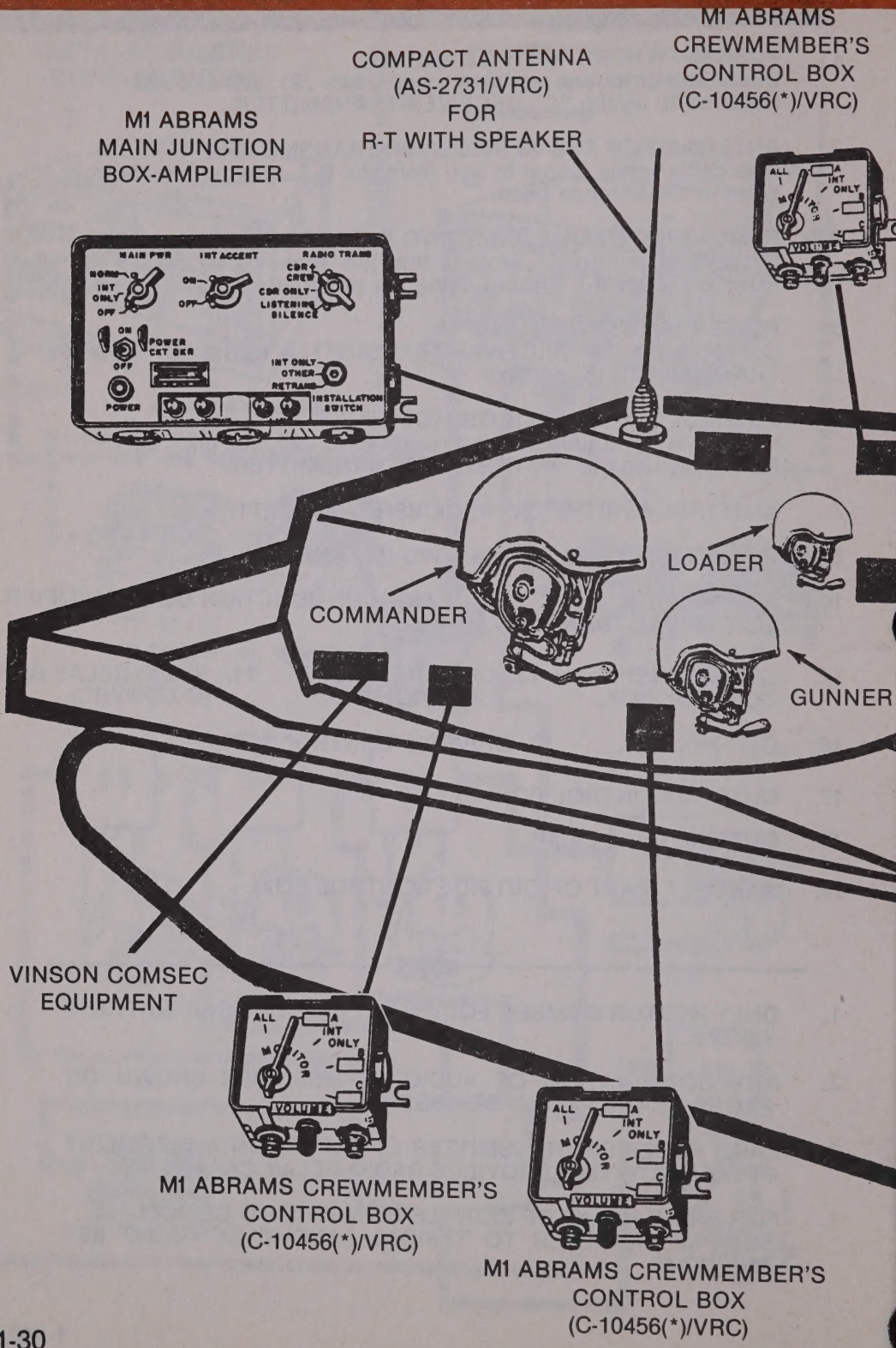
1. ONLY NESTOR COMSEC EQUIPMENT CAN BE USED WITH THE ABOVE.

2. ANY COMBINATION OF AUDIO ACCESSORIES SHOWN ON PAGES 42 AND 44 MAY BE USED.

3. EACH RECEIVER-TRANSMITTER OPERATES ON A DIFFERENT FREQUENCY, THIS PROVIDES RADIO RELAY CAPABILITY.

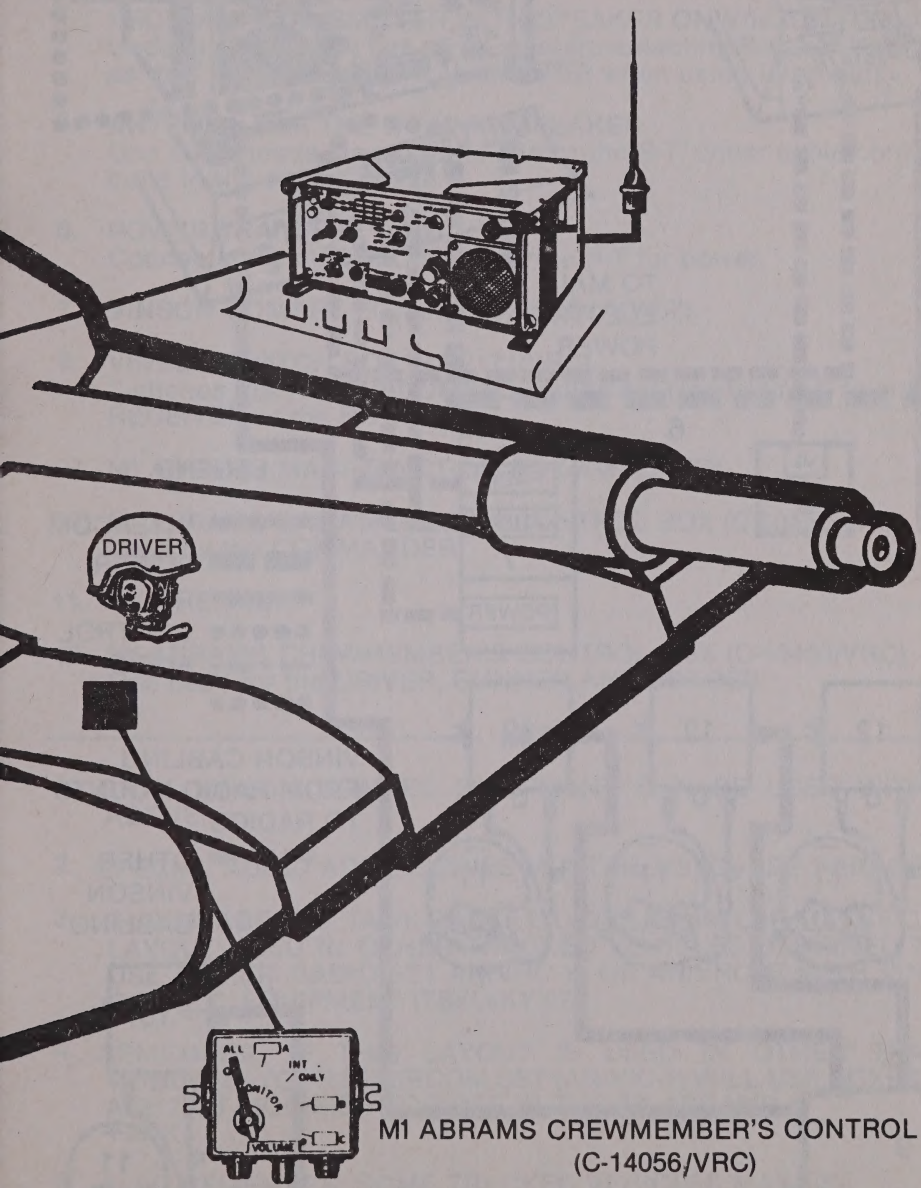
4. FOR RADIO RELAY OF SIGNALS USING VISION COMSEC EQUIPMENT, REFER TO TYPICAL LAYOUT OF RADIO SET AN/VRC-49.

1-18. TYPICAL LAYOUT OF RADIO SET AN/VRC-46 AND INTERCOM SET



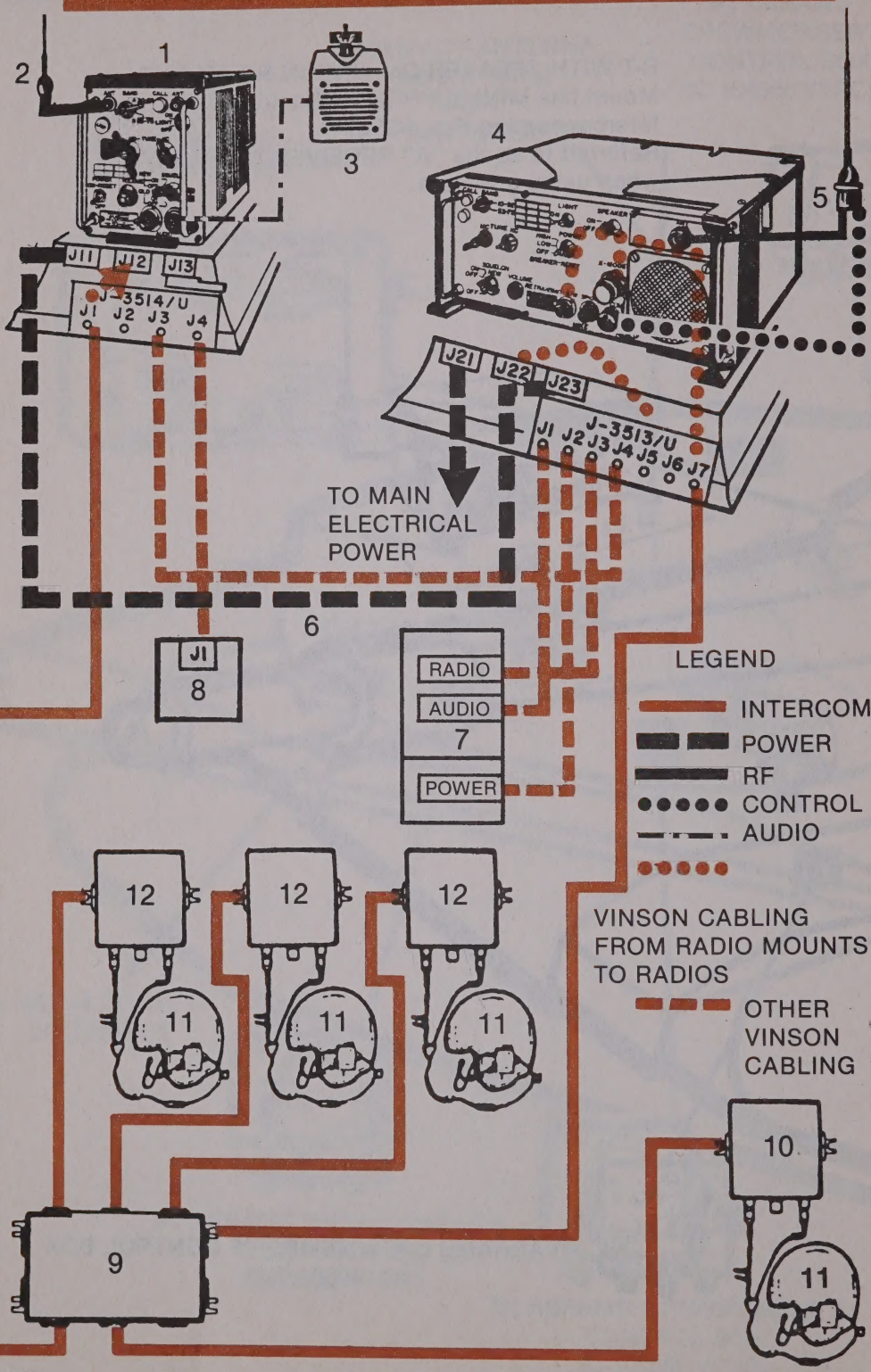
AN/VIC-1 FOR VINSON COMSEC USE IN THE M1 ABRAMS TANK.

R-T WITH SPEAKER ON VINSON R-T MOUNT
Mount has MINI-SUPPRESSOR and wired-in Interconnecting Box J-3513/U.
Referred to as the "A" RECEIVER-TRANSMITTER when using intercom.



M1 ABRAMS CREWMEMBER'S CONTROL BOX
(C-14056/VRC)

1-19. TYPICAL LAYOUT OF RADIO SET AN/VRC-47 AND INTERCOM



SET AN/VIC-1 WITH VINSON COMSEC EQUIPMENT IN THE M1 ABRAMS TANK

1. AUX RECEIVER WITH VINSON AUX RECEIVER MOUNT.
   Underside of mount has MINI-SUPPRESSOR and wired-in Interconnecting Box J3514/U.
   Referred to as the "B" AUX RECEIVER when using intercom.

2. AUX RECEIVER ANTENNA.

3. AUX RECEIVER LOUDSPEAKER.
   Loudspeaker has a short cable permanently connected to it.

4. RECEIVER-TRANSMITTER WITH SPEAKER ON VINSON R-T MOUNT.
   Underside of mount has wired-in Interconnecting Box J-3513/U. Referred to as the "A" RECEIVER-TRANSMITTER when using intercom.

5. ANTENNA FOR THE R-T WITH SPEAKER.
   One cable feeds signals to and from the R-T. Other cable controls the circuits in the antenna base.

6. POWER TRANSFER CABLE.
   Connects the AUX RECEIVER to the R-T for power.

7. VINSON COMSEC EQUIPMENT (TSEC/KY-57).

8. VINSON SWITCH BOX (SA-2171/VRC).
   Switches the VINSON COMSEC equipment (TSEC/KY-57) to either the AUX RECEIVER or the R-T.

9. M1 ABRAMS MAIN JUNCTION BOX-AMPLIFIER.

10. M1 ABRAMS CREWMEMBER'S CONTROL BOX (C-10456/VRC).
    Used by the COMMANDER.

11. CVC HELMET.

12. M1 ABRAMS CREWMEMBER'S CONTROL BOX (C-10456/VRC).
    One each for the DRIVER, GUNNER AND LOADER.

NOTES

1. ONLY VINSON COMSEC EQUIPMENT CAN BE USED WITH THE ABOVE.

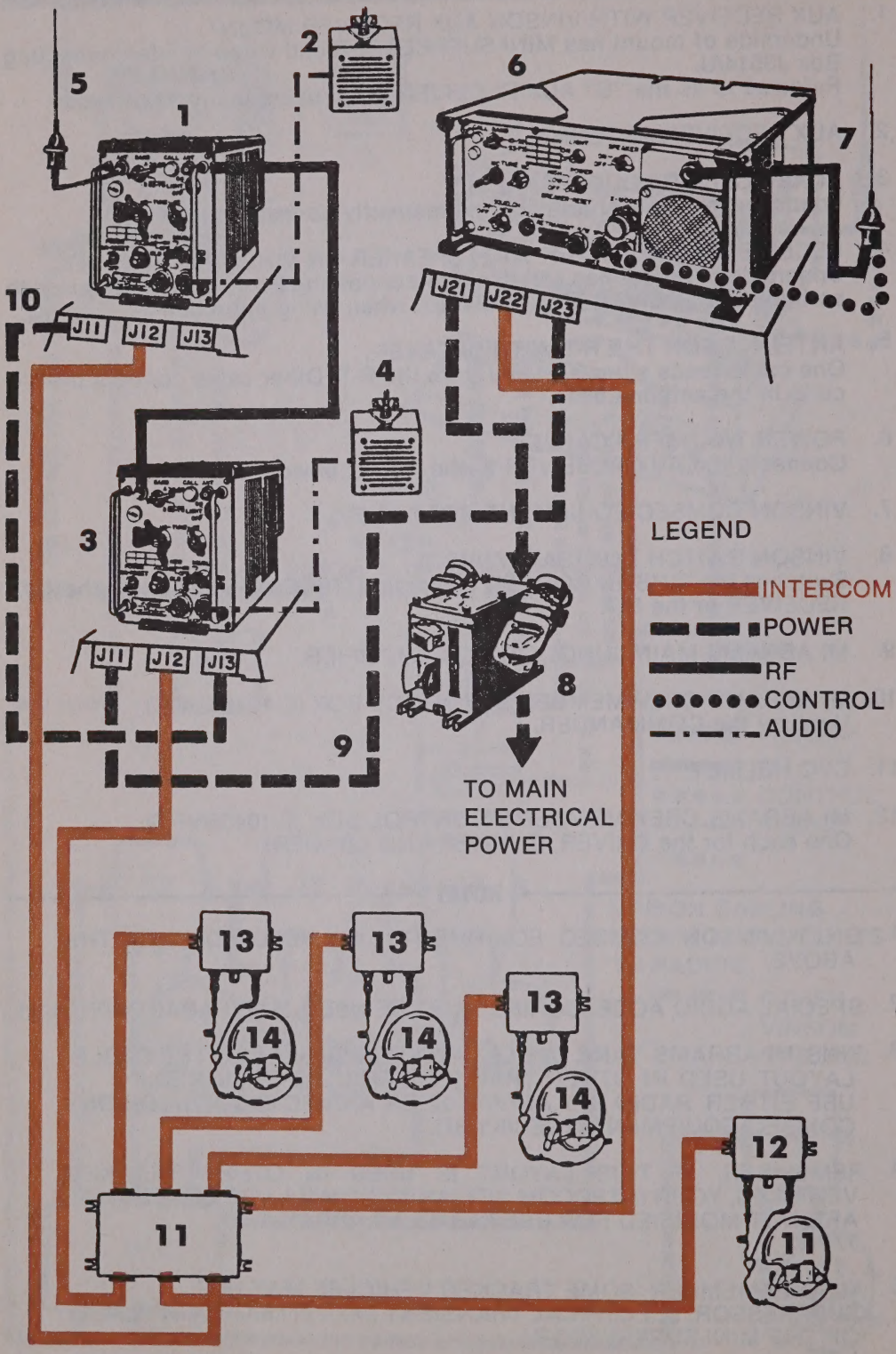
2. SPECIAL AUDIO ACCESSORIES MUST BE USED. SEE PARAGRAPH 1-25.

3. THIS M1 ABRAMS TANK CABLE LAYOUT IS SIMILAR TO THE CABLE LAYOUT USED IN OTHER TRACKED VEHICLES DESIGNED TO USE EITHER RADIO SET AN/VRC-12 OR AN/VRC-47 WITH VINSON COMSEC EQUIPMENT (TSEC/KY-57).

4. REMEMBER, IF THIS LAYOUT IS USED IN OTHER TRACKED VEHICLES, YOUR INTERCOM SET (AN/VIC-1) WILL USE BOXES THAT ARE NOT MODIFIED FOR USE IN THE M1 ABRAMS TANK.

5. ALSO REMEMBER, SOME TRACKED VEHICLES MAY USE SUPPRESSOR, ELECTRICAL TRANSIENT (MX-7777B/GRC) IN PLACE OF THE MINI-SUPPRESSOR.

1-20. TYPICAL LAYOUT OF RADIO SET AN/VRC-48 AND INTERCOM



SET AN/VIC-1 FOR NESTOR COMSEC USE IN A TRACKED VEHICLE

1. AUX RECEIVER WITH ITS MOUNT.
   Underside of mount contains receptacles J11, J12, and J13.
   Referred to as the "C" AUX RECEIVER when using intercom.

2. LOUDSPEAKER FOR THE "C" AUX RECEIVER.
   Loudspeaker has a short cable permanently attached to it.

3. AUX RECEIVER WITH ITS MOUNT.
   Underside of mount contains receptacles J11, J12 and J13.
   Referred to as the "B" AUX RECEIVER when using intercom.

4. LOUDSPEAKER FOR THE "B" AUX RECEIVER.

5. ANTENNA FOR BOTH AUX RECEIVERS.
   Cable connections allow sharing the same antenna.

6. RECEIVER-TRANSMITTER WITH SPEAKER ON ITS MOUNT.
   Underside of mount contains receptacles J21, J22 and J23.
   Referred to as the "A" RECEIVER-TRANSMITTER when using intercom.

7. ANTENNA FOR THE R-T WITH SPEAKER.
   One cable feeds signals to and from the R-T, other cable controls circuits in the antenna base.

8. SUPPRESSOR, ELECTRICAL TRANSIENT.

9. POWER TRANSFER CABLE TO THE "B" AUX RECEIVER.

10. POWER TRANSFER CABLE TO THE "C" AUX RECEIVER.

11. MAIN JUNCTION BOX-AMPLIFIER.

12. COMMANDER'S CONTROL BOX.

13. CREWMEMBER'S CONTROL BOX.

14. CVC HELMET.

NOTES

1. ONLY NESTOR COMSEC EQUIPMENT MAY BE USED WITH THE ABOVE.

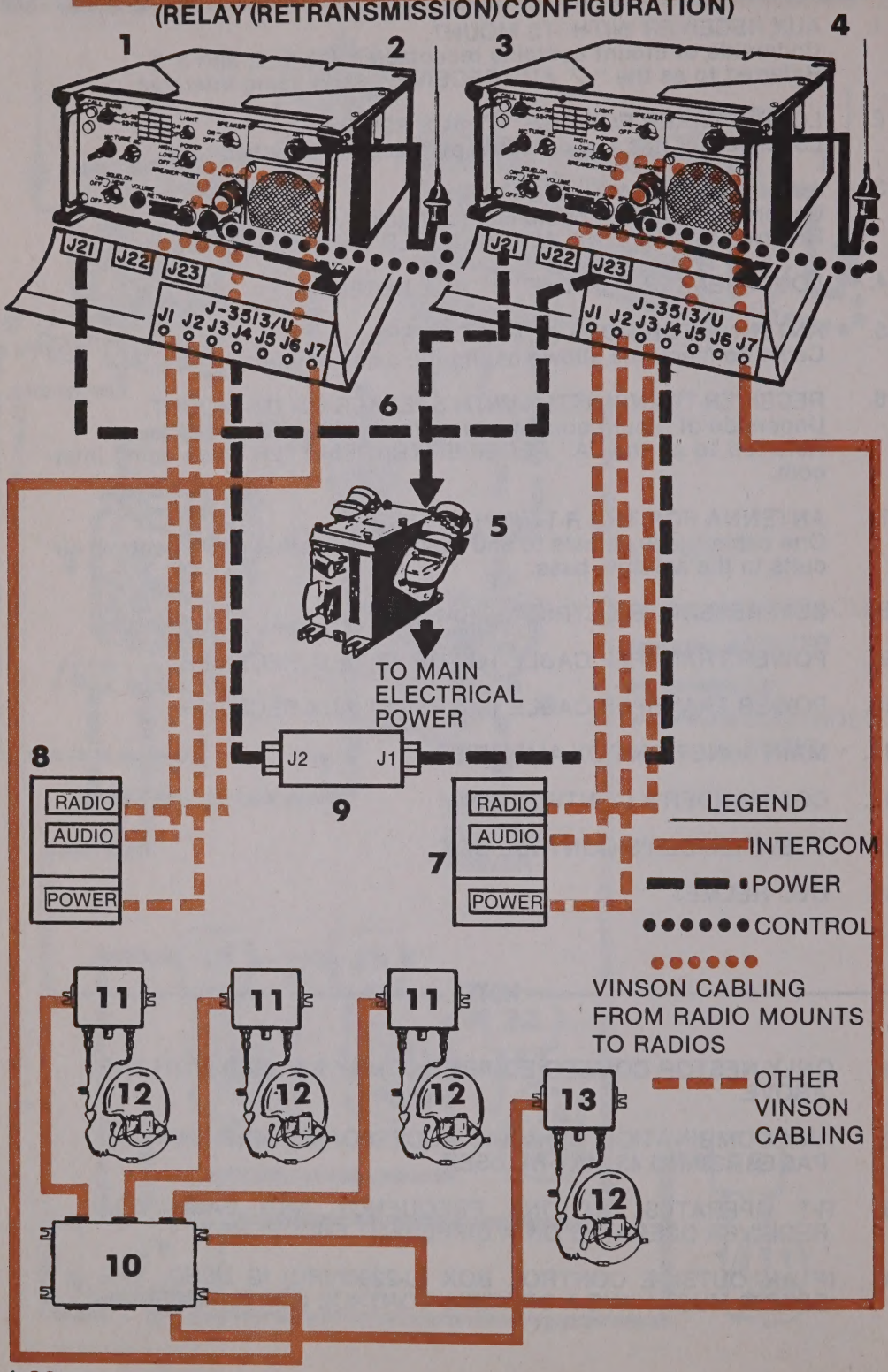
2. ANY COMBINATION OF AUDIO ACCESSORIES AS SHOWN ON PAGES 42 AND 43 MAY BE USED.

3. R-T OPERATES ON ONE FREQUENCY AND EACH AUX RECEIVER OPERATES ON A DIFFERENT FREQUENCY.

4. IF AN OUTSIDE CONTROL BOX (C-2296/VRC) IS USED, THE DRIVER MUST HAVE A DRIVER'S CONTROL BOX (C-2296/VRC).

1-21. TYPICAL LAYOUT OF RADIO SET AN/VRC-49 AND INTERCOM SET

(RELAY (RETRANSMISSION) CONFIGURATION)



AN/VIC-1 FOR RADIO RELAY OF SIGNALS USING VINSON COMSEC EQUIPMENT.

1. RECEIVER-TRANSMITTER WITH SPEAKER ON VINSON R-T MOUNT. Underside of mount has receptacles J21, J22, J23 and wired-in Interconnecting Box J-3513/U. Referred to as the "C" RECEIVER-TRANSMITTER.
2. ANTENNA FOR THE "C" RECEIVER-TRANSMITTER. One cable feeds signal to and from the R-T, other cable controls circuits in the antenna base.
3. RECEIVER-TRANSMITTER WITH SPEAKER ON VINSON R-T MOUNT. Underside of mount has receptacles J21, J22, J23 and wired-in Interconnecting Box J-3513/U. Referred to as the "A" RECEIVER-TRANSMITTER.
4. ANTENNA FOR THE "A" RECEIVER-TRANSMITTER.
5. SUPPRESSOR, ELECTRICAL TRANSIENT.
6. POWER TRANSFER CABLE. Connects the "A" RECEIVER-TRANSMITTER to the "C" RECEIVER-TRANSMITTER for power.

7,8. VINSON COMSEC EQUIPMENT.

9. VINSON RELAY BOX (C-10734/VRC). When using VINSON COMSEC equipment, this box must be used in place of the RADIO RELAY BOX (C-2299/VRC).
10. MAIN JUNCTION BOX-AMPLIFIER.
11. CREWMEMBER'S CONTROL BOX.
12. CVC HELMET.
13. COMMANDER'S CONTROL BOX.

NOTES

1. ONLY VINSON COMSEC EQUIPMENT CAN BE USED WITH THE ABOVE.
2. THE ABOVE TYPICAL LAYOUT APPLIES TO ALL VINSON RADIO RELAY HOOKUPS EXCEPT THOSE THAT MAY BE USED IN THE M1 ABRAMS TANK. IF A VINSON RADIO RELAY HOOKUP IS TO BE MADE UP IN THE M1 ABRAMS , YOU MUST USE MODIFIED INTERCOM SET AN/VIC-1 COMPONENTS.
3. EACH RECEIVER-TRANSMITTER OPERATES ON A DIFFERENT FREQUENCY. THIS PROVIDES RADIO RELAY (RETRANSMISSION) CAPABILITY.
4. FOR RADIO RELAY OF SIGNALS USING NESTOR COMSEC EQUIPMENT, REFER TO THE TYPICAL LAYOUT OF RADIO SET AN/VRC-45.

1-22. PERFORMANCE DATA USING THE EXTENDED RANGE ANTENNA (RC-292 or OE-254/GRC)

- MAXIMUM ERECTED HEIGHT IS APPROXIMATELY 41 FEET.
- ANTENNA ERECTION TIME FOR A TEAM OF TWO IS 15 MINUTES.
- COMM-ELECTRONICS ORG MAINT SHOULD PROVIDE THE EXTRA LONG CABLES NEEDED TO MAKE CONNECTIONS TO THE R-T.
- APPROXIMATE RANGE BETWEEN TWO AN/VRC-12 SERIES OF RADIOS WITH BOTH RADIOS USING THE EXTENDED RANGE ANTENNA.

  36 miles over average terrain.

  36 miles over difficult terrain.

- APPROXIMATE RANGE BETWEEN ONE AN/VRC-12 RADIO SET USING THE EXTENDED RANGE ANTENNA AND THE OTHER AN/VRC-12 RADIO SET USING A WHIP ANTENNA.

  25 miles over average terrain.

  30 miles over difficult terrain.

1-23. PERFORMANCE DATA USING THE TELESCOPING ANTENNA MAST (AB-903/G)

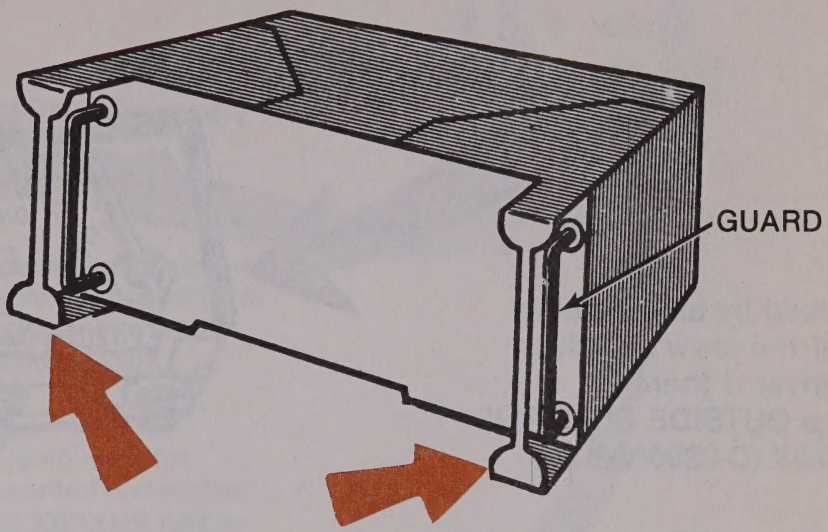
- EITHER THE COMPACT ANTENNA OR ROUND BASE ANTENNA IS MOUNTED ATOP THE TELESCOPING ANTENNA MAST (AB-903/G).
- THE TELESCOPING ANTENNA MAST (AB-903/G) CAN BE HAND-CRANKED FROM 6 FEET TO APPROXIMATELY 30 FEET.

  Time required to hand-crank is approximately 25 seconds.

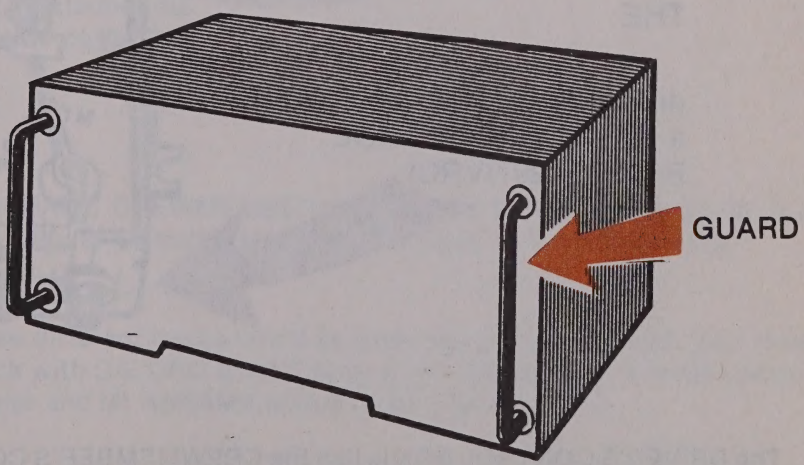
- THE TELESCOPING ANTENNA MAST (AB-903/G) CAN BE ATTACHED TO THE SIDE OF A VEHICLE OR MOUNTED TO THE GROUND.

SECTION III
DIFFERENCES AMONG MODELS

1-24. DIFFERENCES IN HANDLE ASSEMBLIES ON R-T'S



All plain model R-T's have a pair of handle assemblies installed over the front guards.



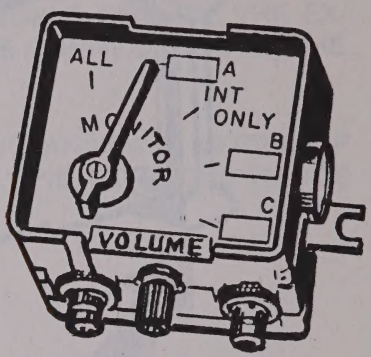
The A model R-T's do not have handle assemblies because their front panel guards are more ruggedly attached to the front panel.

NOTE: The handle assemblies are also provided on some A model R-T's from which one or both front panel guards were removed.

1-25. DIFFERENCES IN CREWMEMBER'S CONTROL BOXES

Two regular crewmember's control boxes are available for use with INTERCOM SET AN/VIC-1. These boxes are used in all installations except the M1 ABRAMS TANK.

CREWMEMBER'S CONTROL BOX (C-2298/VRC)



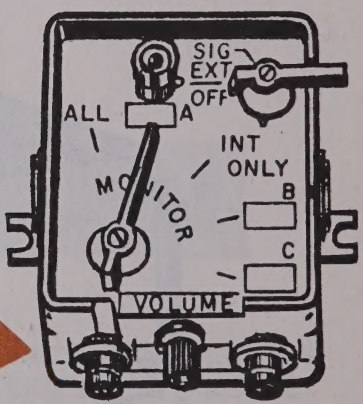
Used by all members of the crew and the driver if there is no OUTSIDE CONTROL BOX (C-2296/VRC)

IF

there is an OUTSIDE CONTROL BOX,

THE

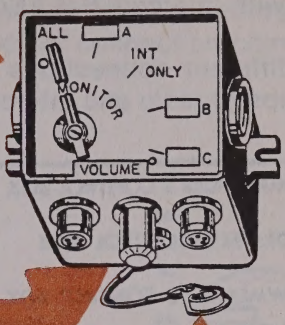
driver needs to have a DRIVER'S CONTROL BOX (C-2297/VRC)



The DRIVER'S CONTROL BOX is like the CREWMEMBER'S CONTROL BOX except it has additional controls. This allows the driver to communicate with the person using the OUTSIDE CONTROL BOX.

1-25. DIFFERENCES IN CREWMEMBER'S CONTROL BOXES - Continued

The M1 ABRAMS CREW MEMBER'S CONTROL BOX-(C-10456( )/VRC)



has a REMOTE CONTROL receptacle.

This receptacle is used for remote control operation at some positions in the M1 ABRAMS TANK.

If there is no need for remote control connection to the M1 ABRAMS CREW-MEMBER'S CONTROL BOX,

YOU must cap the unused REMOTE CONTROL receptacle. Use the special CAP that is attached to the side of the box.

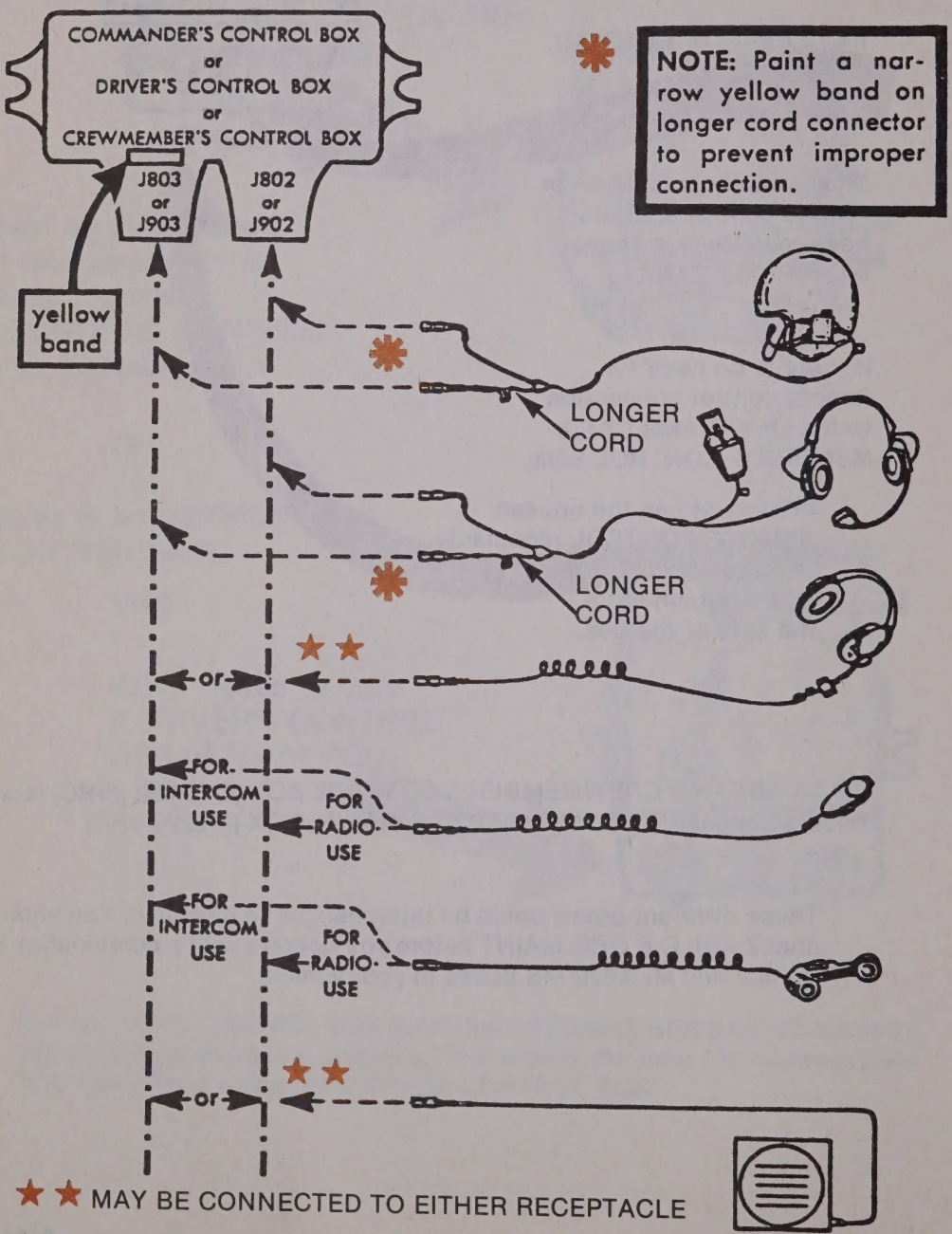
The M1 ABRAMS CREWMEMBER'S CONTROL BOX (C-10456( )/VRC) is a modified regular CREWMEMBER'S CONTROL BOX (C-2298/VRC).

These different boxes could be interchanged in a vehicle. You should check with C-E ORG MAINT before you operate with a combination of regular and M1 ABRAMS boxes in your vehicle.

1-26. DIFFERENT CONNECTIONS OF AUDIO ACCESSORIES FOR RADIO AND INTERCOM OPERATION

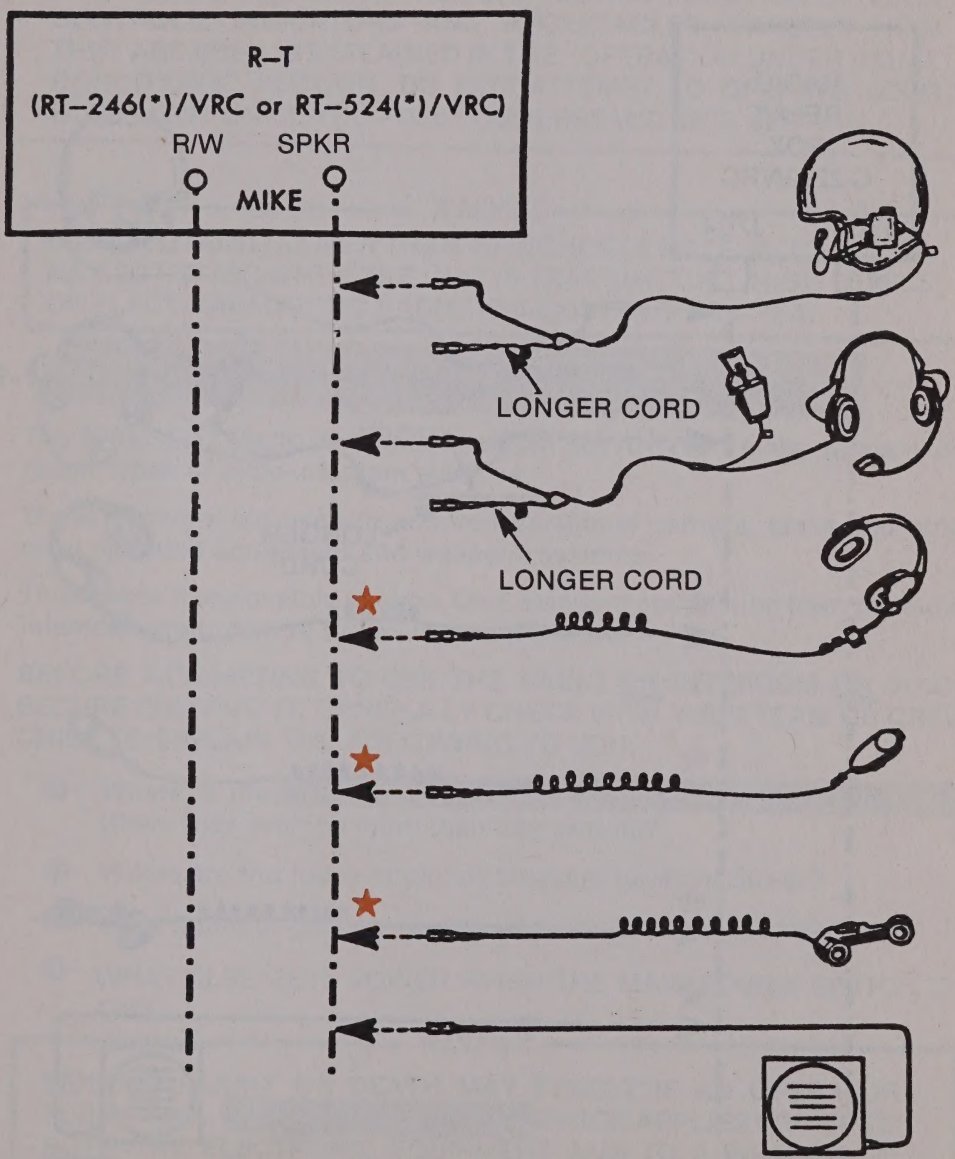
A variety of audio accessories are used when—AN/VRC-12 Radio Sets are used with Intercom Set AN/VIC-1.

The different connections to control boxes show below apply to all hookups of radio and intercom equipment.



1-27. DIFFERENT CONNECTIONS OF AUDIO ACCESSORIES TO R-T FRONT PANEL

Your audio accessories are usually connected to control boxes. In an emergency or while troubleshooting, it may be necessary to connect audio accessories directly to the R-T front panel. Typical connection combinations are shown below.

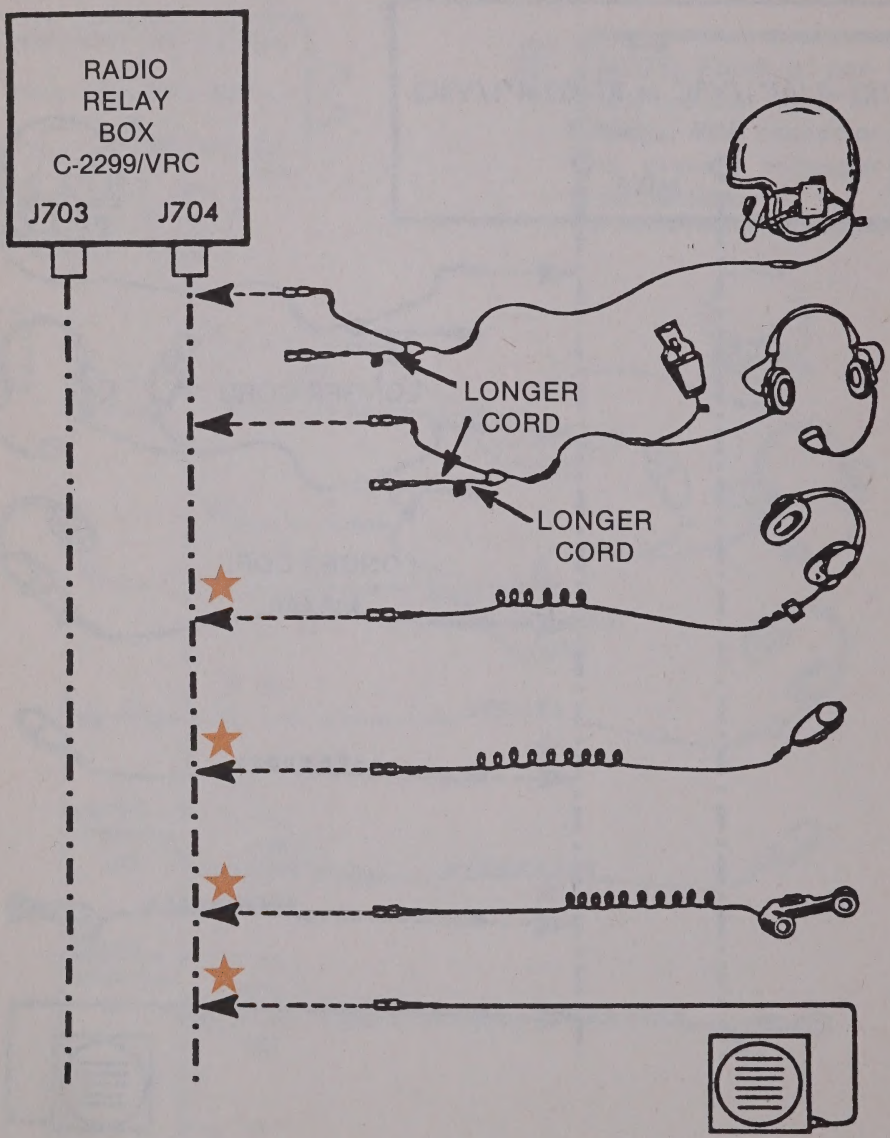


★ May be connected to either the R/W or SPKR receptacle on the R-T.

1-28. DIFFERENT CONNECTIONS TO RADIO RELAY BOX (C-2299/VRC)

In some hookups, you may find RADIO RELAY BOX (C-2299/VRC) being used as an audio convenience box.

The different connections shown below apply to all hookups EXCEPT in the M1 ABRAMS TANK.



★ May be connected to either receptacle on the RADIO RELAY BOX.

CHAPTER 2
OPERATING INSTRUCTIONS
SECTION I
DESCRIPTION AND USE OF OPERATOR'S CONTROLS, INDICATORS AND RECEPTACLES

CAUTION

THIS SECTION EXPLAINS THE PURPOSE AND FUNCTION OF YOUR CONTROLS, INDICATORS AND RECEPTACLES. EXACTLY HOW THEY ARE USED IS EXPLAINED IN THE "OPERATION UNDER USUAL CONDITIONS" SECTION. DO NOT ATTEMPT TO OPERATE YOUR EQUIPMENT UNTIL YOU FULLY UNDERSTAND THIS SECTION.

WARNING

DO NOT STAND CLOSER THAN 20 INCHES (.5 METERS) TO ANTENNA AS-1729/VRC WHEN THE UNIT IS TRANSMITTING. HIGH LEVELS OF ELECTROMAGNETIC RADIATION EXIST IN THIS AREA.

2-1. OPERATOR'S MAIN POWER CONTROLS AND INDICATORS

The AN/VRC-12 Radio Sets with Intercom Set AN/VIC-1 make up many different types of radio-intercom systems.

These systems are used in armored personnel carriers, tanks and other crew operated equipment and weapons systems.

This makes it impossible to show ONE standard connection from the radio-intercom equipment to the main power source.

BEFORE ATTEMPTING TO USE THE RADIO OR INTERCOM OR VOICE SECURE EQUIPMENT, CAREFULLY CHECK WITH YOUR TEAM OR CREW CHIEF TO EXPLAIN THE FOLLOWING TO YOU:

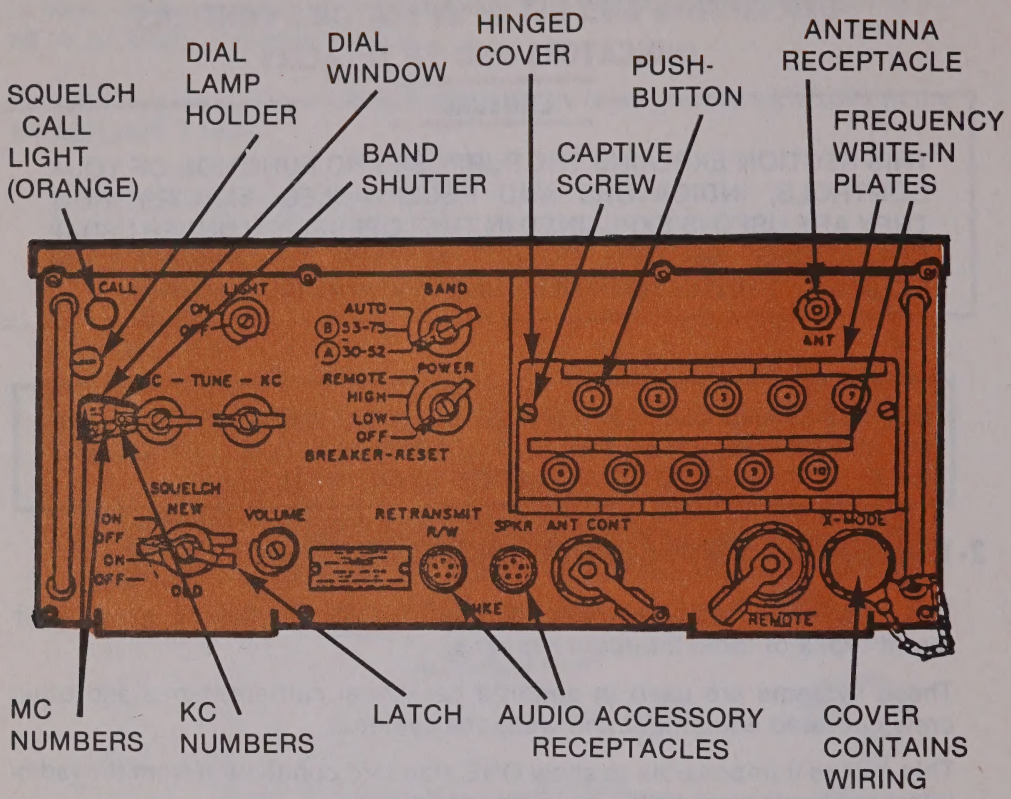
- Where is the INSTALLATION or VEHICLE MAIN POWER SWITCH (there may even be more than one switch)?
- Where are the fuses or circuit breakers for main power?
- What lights or gauges operate when main power is ON?
- WHAT ELSE GETS POWER WHEN THE MAIN POWER SWITCH IS ON?

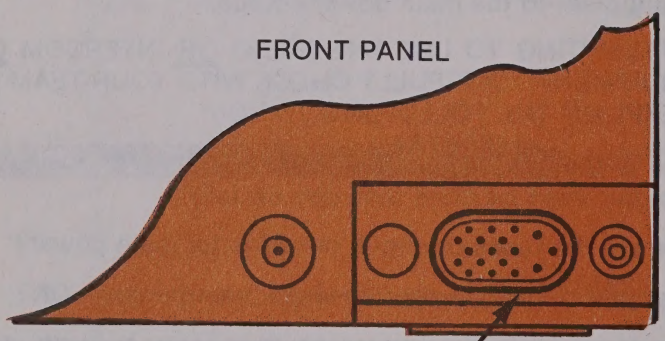
WARNING

SERIOUS INJURY OR DEATH MAY RESULT IF AN OPERATOR TURNS ON A MAIN POWER SWITCH WHICH APPLIES POWER TO BOTH THE ELECTRONIC EQUIPMENT AND TO A WEAPON OR TURRET OR SOME OTHER SYSTEM.

- What must be done before the MAIN POWER is turned ON? Examples: Place the vehicle in PARK; engage a certain brake, close a certain hatch; place certain controls in the neutral position, etc.

2-2. LOCATION OF ALL CONTROLS, INDICATORS AND RECEPTACLES ON PUSHBUTTON R-T (RT-246(*)/VRC)



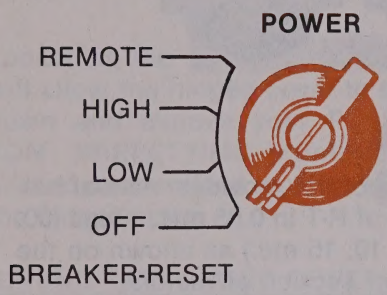


REAR VIEW

2-3. POWER SWITCH ON PUSHBUTTON R-T (RT-246(*)/VRC)

POWER switch has 4 positions.

OFF BREAKER-RESET Removes power from the R-T and resets circuit breakers (inside the R-T) if they are tripped.



LOW turns on dc power to PUSHBUTTON R-T; when R-T is keyed it transmits on low rf power (0.5 to 8 watts).

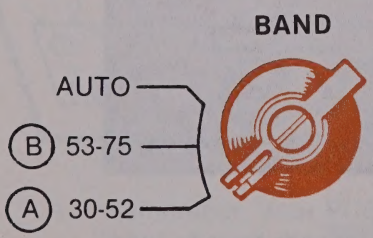
HIGH turns on dc power to PUSHBUTTON R-T; when R-T is keyed it transmits on high rf power (35 watts minimum).

REMOTE transfers control of dc power and selection of R-T frequency to the REMOTE CONTROL BOX (C-2742/VRC) when it is connected to the **REMOTE** receptacle on the R-T.

2-4. BAND SWITCH ON PUSHBUTTON R-T (RT-246(*)/VRC)

BAND switch has 3 positions.

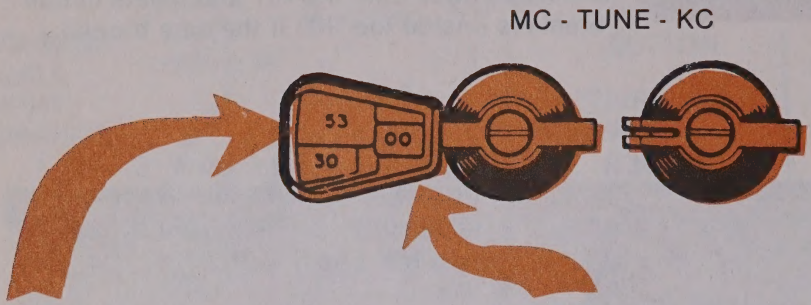
A 30-52 position sets up R-T circuits for manual tuning band A (30.00 mHz to 52.95 mHz).



B 53-75 position sets up R-T circuits for manual tuning band B (53.00 mHz to 75.95 mHz).

AUTO position permits automatic tuning of the PUSHBUTTON R-T when you use the pushbuttons.

2-5. MC-TUNE-KC CONTROLS FOR MANUAL TUNING OF PUSHBUTTON R-T (RT-246(*)/VRC)



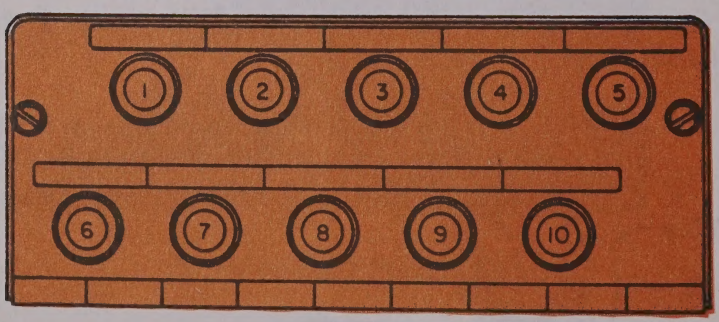
MC control provides manual tuning of R-T in 1 mHz steps (30, 31, 53, 54 etc.) as shown on the outer section of the dial.

KC control provides manual tuning of R-T in 0.05 mHz steps (00, 05, 10, 15 etc.) as shown on the inner section of the dial.

NOTE:

A shutter covers the MC numbers of the BAND not being used.

2-6. PUSHBUTTONS ON PUSHBUTTON R-T (RT-246(*)/VRC.

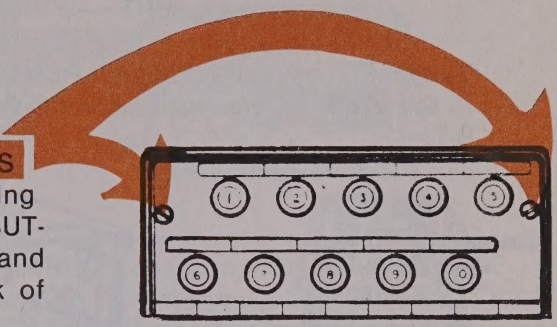


Any one of 10 preset channels frequencies for the PUSHBUTTON R-T can be selected by pressing the proper PUSHBUTTON.

2-7. CONTROLS FOR PRESETTING THE PUSHBUTTONS ON PUSHBUTTON R-T (RT-246(*)/VRC)

You will be required to preset each of the 10 PUSHBUTTON channels to an authorized frequency. Your controls are located behind the hinged PUSHBUTTON cover.

Loosening the CAPTIVE SCREWS will allow the hinged cover to swing down and expose your PUSHBUTTON PRESETTING controls and printed instructions on the back of the hinged cover.

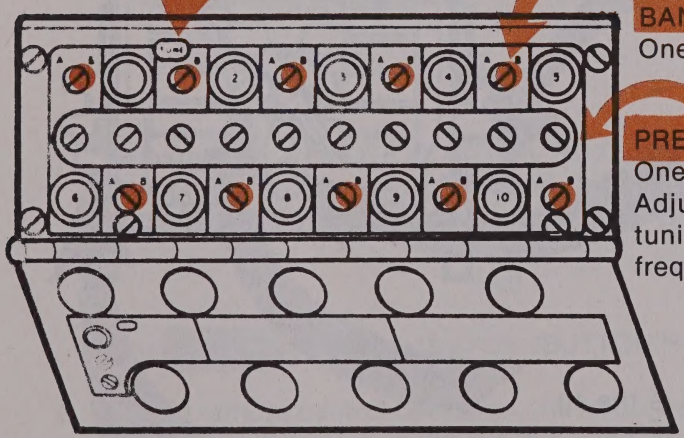


BEHIND THE HINGED COVER YOU WILL FIND:

TUNE button. One for use with all 10 channels. Must be pushed in to allow PRESET CONTROL adjustments to be made.

BAND SELECTOR SWITCH
One for each channel.

PRESET CONTROLS
One for each channel. Adjusts PUSHBUTTON R-T tuning circuits to desired frequency.



NOTES:

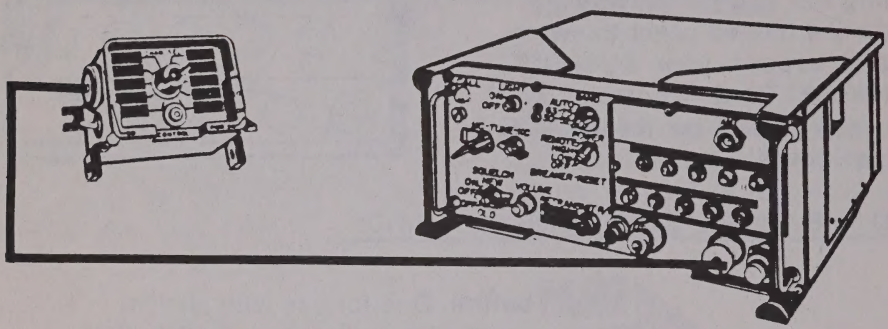
1. Remember, your PUSHBUTTONS will only work if you have placed the BAND switch in AUTO, or when POWER SWITCH is in REMOTE.
2. During PUSHBUTTON tuning, the frequency of the channel you have selected will appear in the dial window.
3. Write-in the frequency for each pushbutton on the write-in plates on the front of the hinged cover.

2-8. OPERATOR'S CONTROLS ON REMOTE CONTROL BOX (C-2742/VRC)

After presetting the pushbuttons on your PUSHBUTTON R-T, you can use remote control.

BUT-------FIRST----

You must make sure that your REMOTE CONTROL BOX is connected to the REMOTE receptacle on the front panel of your PUSHBUTTON R-T.



REMOTE CONTROL BOX (C-2742/VRC)

SW switch and CONTROL indicator lamp.

SW switch is spring loaded.

When pressed, the CONTROL indicator lamp lights up.

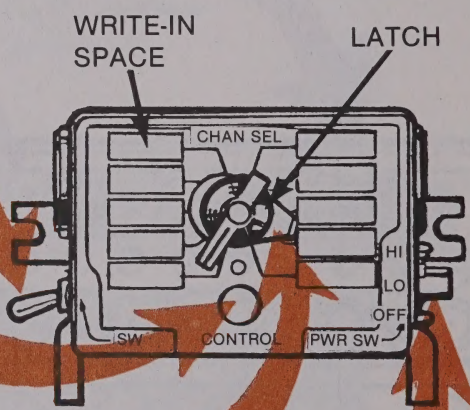
AND

You now have control of the PUSHBUTTON R-T.

CHAN SEL switch.
Used to select any one of the 10 present frequencies.

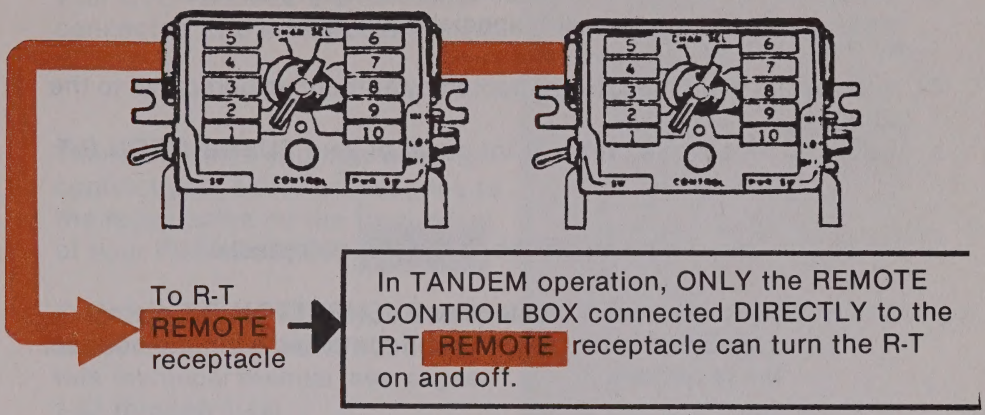
PWR SW switch is used to:
Control power to the R-T and R-T power output:

- OFF removes power from PUSHBUTTON R-T.
- LO PUSHBUTTON R-T transmits on low power.
- HI PUSHBUTTON R-T transmits on high power.



2-9. OPERATOR'S CONTROLS FOR TANDEM OPERATION OF REMOTE CONTROL BOXES (C-2742/VRC)

Two REMOTE CONTROL BOXES (C-2742/VRC) can be connected in TANDEM as shown below.


To R-T
REMOTE
receptacle
In TANDEM operation, ONLY the REMOTE CONTROL BOX connected DIRECTLY to the R-T REMOTE receptacle can turn the R-T on and off.

Only one REMOTE CONTROL BOX can control the PUSHBUTTON R-T at one time.

Pressing the SW toggle switch on your REMOVE CONTROL BOX will: make your CONTROL lamp light up and the CONTROL lamp on the other box to go out. When you release your SW toggle switch, your CONTROL lamp will stay lighted, indicating you have control of the R-T.

NOTES:

1. Remember, a REMOTE CONTROL BOX will not operate unless: The proper cable connections have been made to the REMOTE receptacle on the front panel of the PUSHBUTTON R-T.

   and

   The POWER switch on the PUSHBUTTON R-T is set to REMOTE.

2. During remote control operation, the frequency of the channel you selected will appear in the R-T dial window.

3. Don't forget to write in the preset frequencies on the space on the front of the REMOTE CONTROL BOX.

4. To return control of the PUSHBUTTON R-T to its front panel controls, turn the PUSHBUTTON R-T POWER switch from REMOTE to HI or LO.

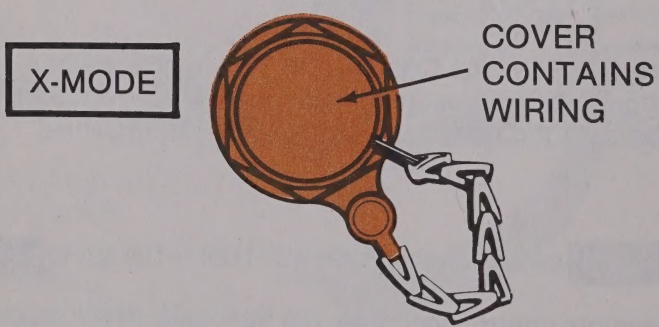
2-10. PUSHBUTTON R-T (RT-246/VRC) X-MODE RECEPTACLE

- Your PUSHBUTTON R-T can be used for X-MODE operation.
- This mode is used for the sending and receiving of voice secure or digital signals with special equipment.
- This special equipment is connected by authorized personnel to the X-MODE receptacle on the front panel of your PUSHBUTTON R-T.
- When the cover is taken off the X-MODE receptacle:

  Special circuits inside your PUSHBUTTON R-T are disconnected because the cover contained wiring to connect these circuits.

AND

When the cable from the X-MODE equipment is connected to your X-MODE receptacle, these circuits are reconnected in a special way.



- REMEMBER, if no cable is connected to your front panel X-MODE receptacle, make sure the cover is snugly on the X-MODE receptacle.

2-11. AUDIO ACCESSORY RECEPTACLES ON PUSHBUTTON R-T (RT-246(*)/VRC)

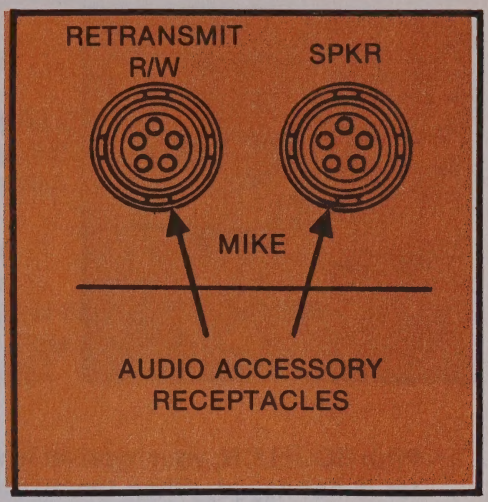
Your audio accessories including your CVC HELMET are normally connected to the intercom system.

BUT

There are times you may need to connect your audio accessories to the receptacles on the front panel of your PUSHBUTTON R-T.

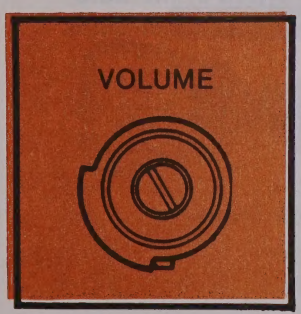
Exactly how and when you do this is covered in the other sections of this technical manual (see pages 1-42 through 1-44).

ALSO



During special operations like RADIO WIRE INTEGRATION (RW1), the two audio receptacles have to be connected by special cables to certain items.

2-12. VOLUME CONTROL ON PUSHBUTTON R-T (RT-246(*)/VRC)



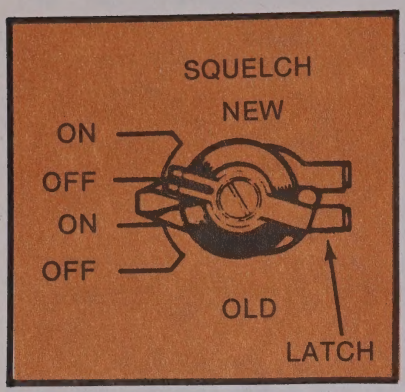
You can adjust the volume level to any loudspeaker or earphone connected to or through the RETRANSMIT R/W or SPKR receptacle on the front panel of the PUSHBUTTON R-T.

NOTE

The VOLUME control MAY or MAY NOT affect the signals being heard over the intercom system. Specific instructions on setting volume are given in the "OPERATION UNDER NORMAL CONDITIONS" SECTION. (P.S. Be careful not to use excessive force on its clockwise stop).

2-13. SQUELCH CONTROL ON PUSHBUTTON R-T (RT-247(*)/VRC)

WHAT IS SQUELCH?



When you are listening to an unsquelched fm receiver, you will hear a constant rushing and hissing sound until the distant transmitter is keyed.

When the distant transmitter stops transmitting, the rushing and hissing sound returns.

With SQUELCH, your receiver is silenced during the time the transmitter is not keyed. When the distant transmitter is keyed, your receiver SQUELCH circuits are automatically disabled and you are able to hear the message.

New fm radio sets like the AN/VRC-12 have a new squelch design to automatically disable the distant receiver SQUELCH circuits. Operating with newer sets or another AN/VRC-12 is normally done with all receiver and transmitter SQUELCH controls in the NEW ON positions.

BUT

You may be asked to communicate with some older types of fm radio sets that use an old design for disabling receiver SQUELCH circuits.

Operating your AN/VRC-12 radio set with older sets is done with the receiver and transmitter SQUELCH controls in the OLD ON positions.

A latch allows you to restrict the SQUELCH switch movement to OLD or NEW squelch operation.

NOTE:

FOR RELIABLE COMMUNICATIONS, MAKE SURE THAT THE DISTANT STATION AND YOU HAVE YOUR SQUELCH CONTROLS IN THE SAME POSITION.

2-14. LAMPS AND INDICATORS ON PUSHBUTTON R-T (RT-246(*)/VRC)

CALL lamp.

During SQUELCH operation, it lights up to indicate a signal is being received.

BUT

You must have the SQUELCH control set to NEW ON or OLD ON.

AND

The LIGHT switch to ON.

LIGHT switch.

CALL

LIGHT

ON

OFF

Controls power to DIAL WINDOW LAMP

AND

to squelch CALL lamp.

LAMP

DIAL WINDOW LAMP.

53

30

00

Controls the lamp to light up the DIAL WINDOW.

NOTE:

The lamps will light up only if you have the LIGHT switch at ON.

2-15. ANT RECEPTACLE ON PUSHBUTTON R-T (RT-246(*)/VRC)

A thin cable is connected from this receptacle to the ase of the ANTENNA MATCHING UNIT.

ANT

2-16. ANT CONT RECEPTACLE ON PUSHBUTTON R-T (RT-246(*)/VRC)

A cable connection is made from this receptacle to the base of the:

COMPACT ANTENNA MATCHING UNIT (MX-9146/GRC) or ROUND BASE ANTENNA MATCHING UNIT (MX-6707/VRC)

OR BOX BASE ANTENNA MATCHING UNIT (MX-2799/VRC)

AND

Whenever you change the R-T frequency, the proper circuits in the antenna matching unit are automatically selected.

WARNING

IN SOME HOOKUPS, LIKE IN SOME MODELS OF THE M60A2 TANK, NEW TYPE "SPECIAL PURPOSE" CABLES MUST BE USED TO CONNECT THE R-T ANT CONT AND ANT RCEPTACLES TO THE ANTENNA MATCHING UNIT.

IF YOU USED STANDARD CABLES, SERIOUS INJURY OR EVEN DEATH CAN OCCUR BECAUSE THE STANDARD CABLES MAY RADIATE UNDESIRABLE SIGNALS THAT COULD CAUSE THE MAIN TURRET AND/OR THE TANK COMMANDER'S CUPOLA AND/OR MAIN GUN TO MOVE VIOLENTLY.

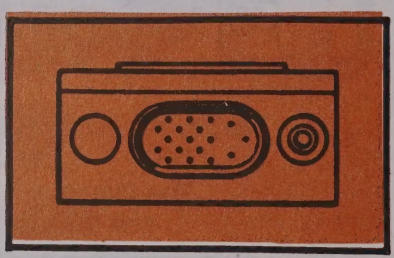
2-17. POWER/AUDIO RECEPTACLE ON PUSHBUTTON R-T (RT-246(*)/VRC)

Located in the rear of the PUSHBUTTON R-T.

This is the main channel for:
power to the PUSHBUTTON R-T.

AND

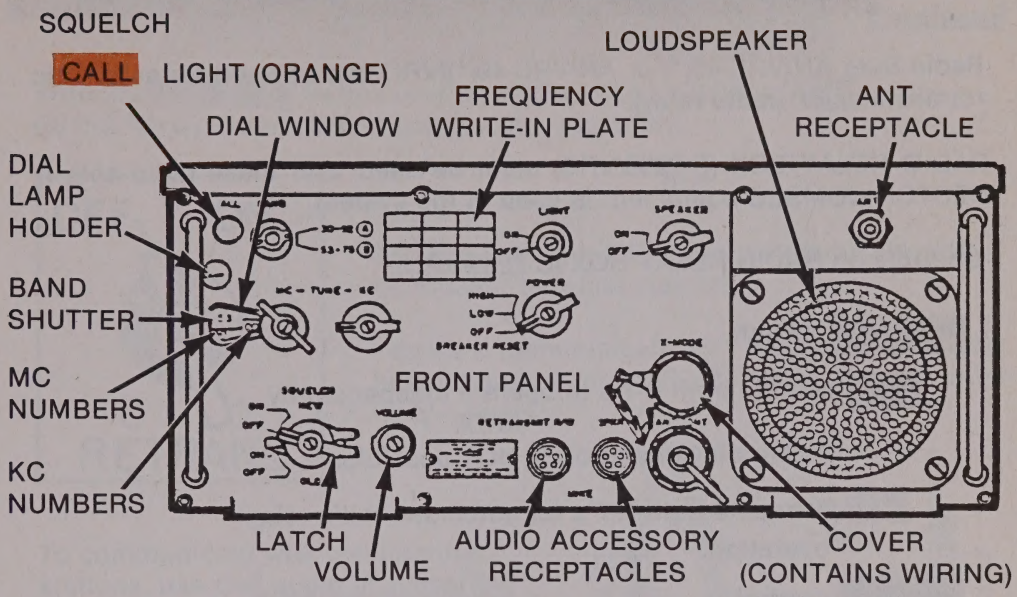
Passage of the dc power and control and audio signals between the PUSHBUTTON R-T and equipment connected to the underside of the PUSHBUTTON R-T MOUNT.

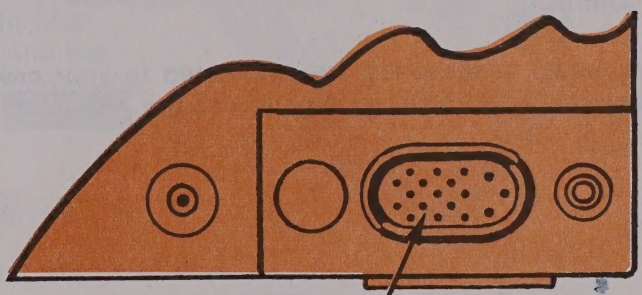


CAUTION

Always carefully check this receptacle before placing an R-T on the R-T MOUNT.

2-18. LOCATION OF ALL CONTROLS, INDICATORS AND RECEPTACLES ON R-T WITH SPEAKER (RT-524(*)/VRC)





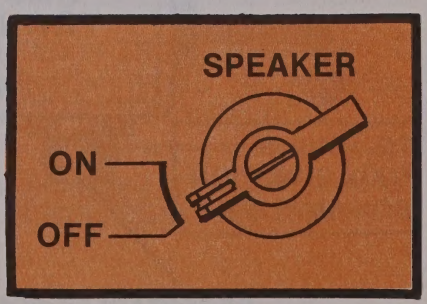
POWER/AUDIO RECEPTACLE (P401)
REAR VIEW

NOTES:

1. The operator's controls, indicators and receptacles on the R-T WITH SPEAKER (RT-524(*)/VRC) are identical with those on the PUSHBUTTON R-T (RT-246(*)/VRC) except for PUSHBUTTON TUNING and REMOTE CONTROL.

2. The R-T WITH SPEAKER (RT-524(*)/VRC) has a built-in loudspeaker and a SPEAKER switch in place of the push-button machinery.

3. The SPEAKER switch controls the built-in speaker. It only connects or disconnects it. Volume is controlled by the VOLUME control.



2-19. OPERATOR'S CONTROLS ON RADIO RELAY BOX (C-2299/VRC) FOR RADIO RELAY OPERATION

Radio Sets AN/VRC-45(*) or AN/VRC-49(*)/VRC can be used for automatic retransmission (radio relay).

RADIO RELAY BOX (C-2299/VRC) must be used with these radio sets if NESTOR COMSEC equipment is used in the system.

Controls on RADIO RELAY BOX (C-2299/VRC).

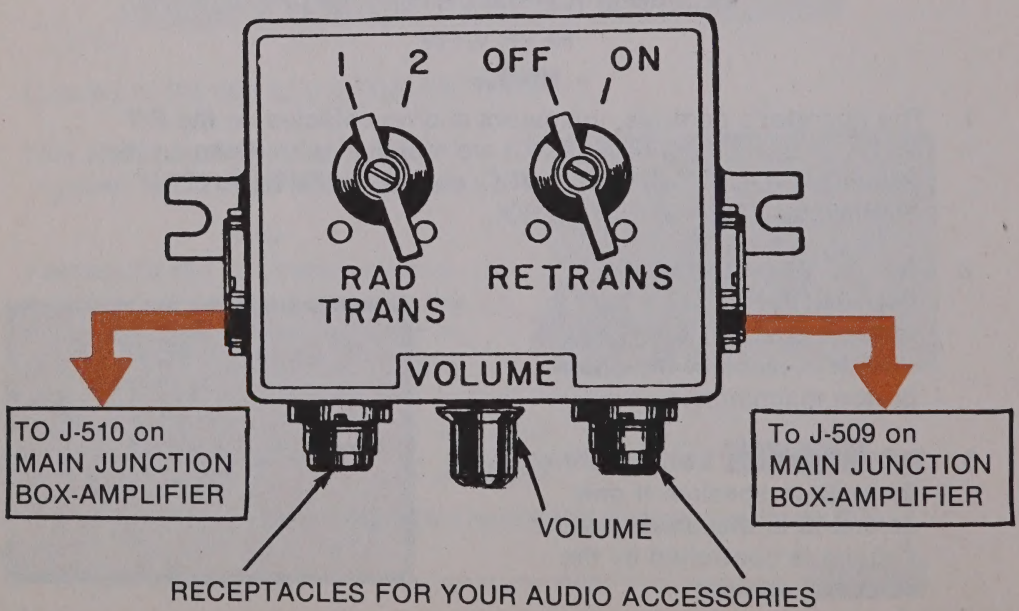
RETRANS switch.

OFF permits both R-T's to operate independently.
AND
Radio relay operation is NOT possible.

ON Connects both R-T's for automatic radio relay operation.

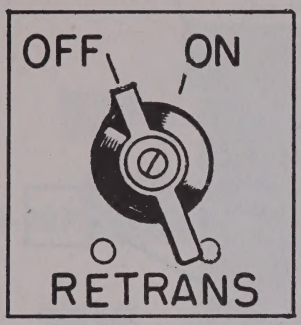
VOLUME control.

Normally, your audio accessories are connected to your crewmember's control box and you would have no need to use the VOLUME control.



2-19. OPERATOR'S CONTROLS ON RADIO RELAY BOX (C-2299/VRC) FOR RADIO RELAY OPERATION - Continued

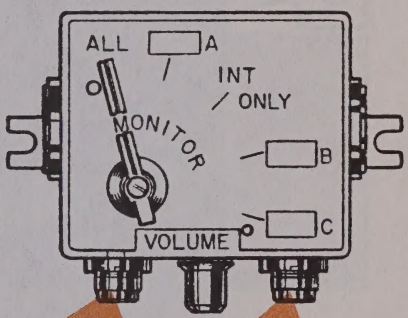
With the RETRANS switch on your RADIO RELAY BOX at OFF, you do not have retransmission (radio relay) capability.



BUT

You can use your 2 R-T's to communicate with the distant terminal stations.

You must communicate with the terminal stations before you turn your 2 R-T's over to them for radio relay operation.



To communicate with the terminal stations, use the audio accessories connected to your control box and the correct position of the MONITOR switch (position A or C).

RAD TRANS switch.

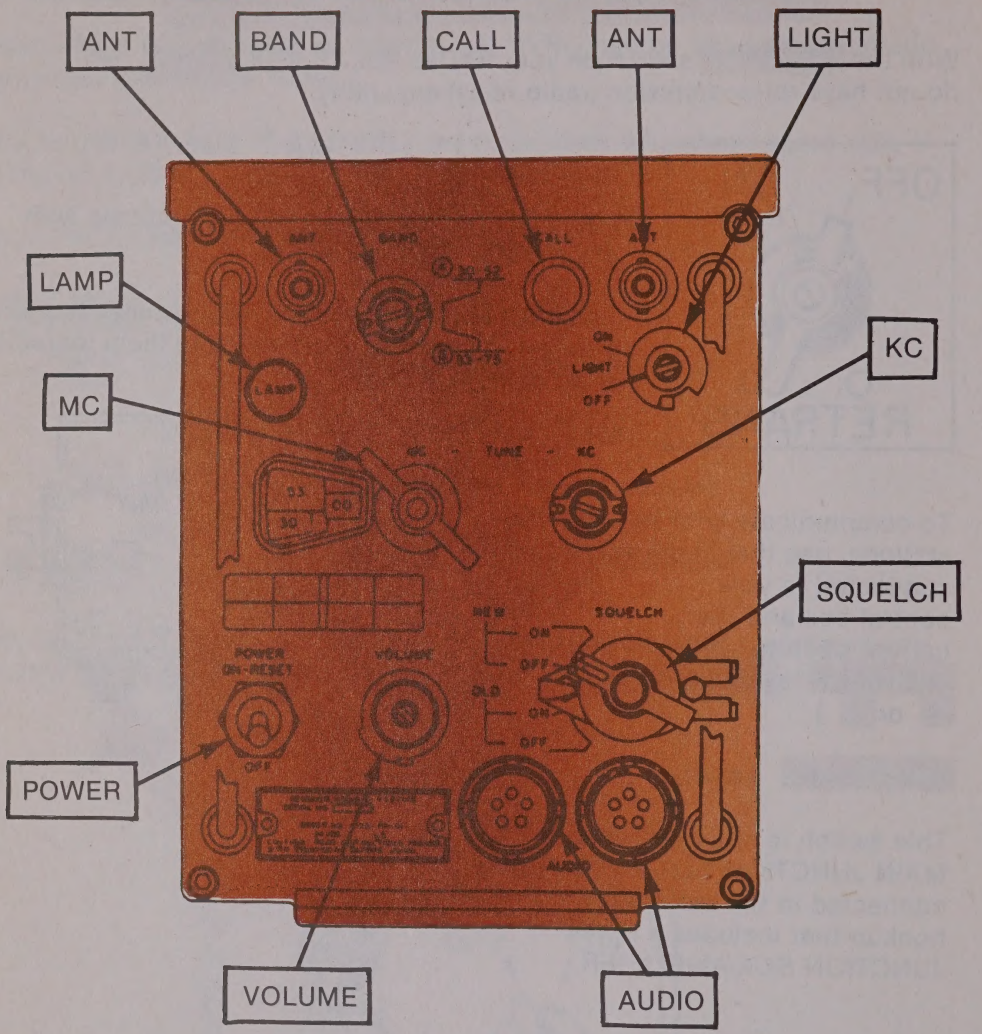
This switch is not used when a MAIN JUNCTION BOX-AMPLIFIER is connected in the radio relay hookup that includes a MAIN JUNCTION BOX-AMPLIFIER.

CAUTION

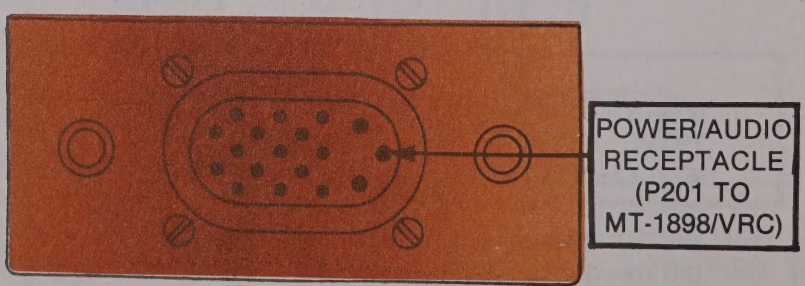
IF VINSON COMSEC EQUIPMENT IS USED IN THE COMMUNICATIONS SYSTEM, YOU MUST USE VINSON RADIO RELAY BOX (C-10734/VRC) IN PLACE OF RADIO RELAY BOX (C-2299/VRC).

NOTE: Remember, proper radio relay setup and operation includes the use of the RADIO RELAY BOX, MAIN JUNCTION BOX-AMPLIFIER and your crewmember's control box.

2-20. LOCATION OF ALL CONTROLS, INDICATORS AND RECEPTACLES ON AUX RECEIVER (R-442(*)/VRC)

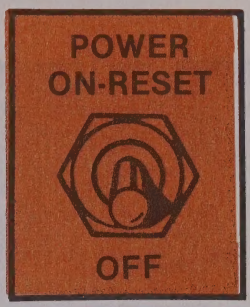


FRONT PANEL



REAR VIEW

2-21. POWER SWITCH ON AUX RECEIVER (R-442(*)/VRC)



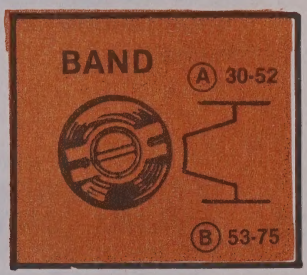
POWER switch has 2 positions.

ON-RESET applies power to AUX RECEIVER AND

resets built-in circuit breaker if it is tripped.

OFF removes power from AUX RECEIVER.

2-22. BAND SWITCH ON AUX RECEIVER (R-442(*)/VRC)

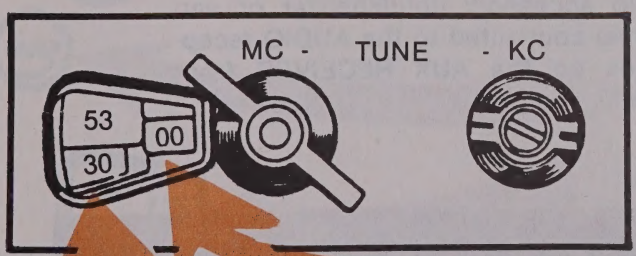


BAND switch has 2 positions.

Ⓐ 30-52 position sets up AUX RECEIVER for tuning band A (30.00 mHz to 52.95 mHz).

Ⓑ 53-75 position sets up AUX RECEIVER for tuning band B (53.00 mHz to 75.95 mHz).

2-23. MC-TUNE-KC CONTROLS ON AUX RECEIVER (R-442(*)/VRC)

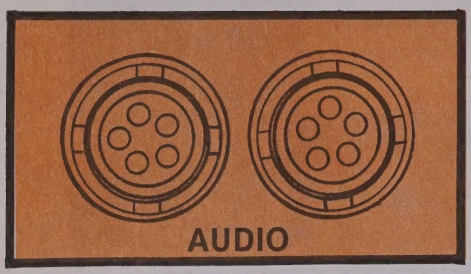


Your AUX receiver can only be tuned manually, using the **BAND** switch and the **MC** and **KC** controls.

MC control provides manual tuning of the AUX RECEIVER in 1 mHz steps (30, 31, 53, 54 etc.) as indicated on the outer section of the dial window.

KC control provides manual tuning of the AUX RECEIVER in 0.05 mHz steps (00, 05, 10, 15 etc.) as indicated on the inner section of the dial window.

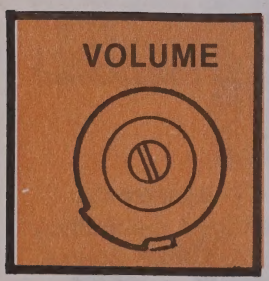
2-24. AUDIO ACCESSORY RECEPTACLE ON AUX RECEIVER (R-442(*)/VRC)



There are 2 identical AUDIO accessory receptacles.

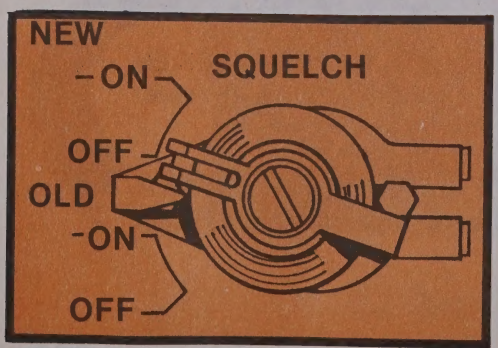
During normal operation, your audio accessories may be connected to the two AUDIO receptacles in the combinations shown throughout this technical manual.

2-25. VOLUME CONTROL ON AUX RECEIVER (R-442(*)/VRC)



You can adjust the volume level to any audio accessory (loudspeaker or earphone) connected to the AUDIO receptacles on the AUX RECEIVER front panel.

2-26. SQUELCH CONTROL ON AUX RECEIVER (R-442(*)/VRC)



The AUX receiver SQUELCH control is operated in the same way as the SQUELCH control on the R-T.

2-27. LAMPS AND INDICATORS ON PUSHBUTTON R-T (RT-442(*)/VRC)

CALL lamp (ORANGE).

During SQUELCH operation, it lights up to indicate that a signal is being received.

BUT

You must have the SQUELCH control set to NEW ON or OLD ON.

AND

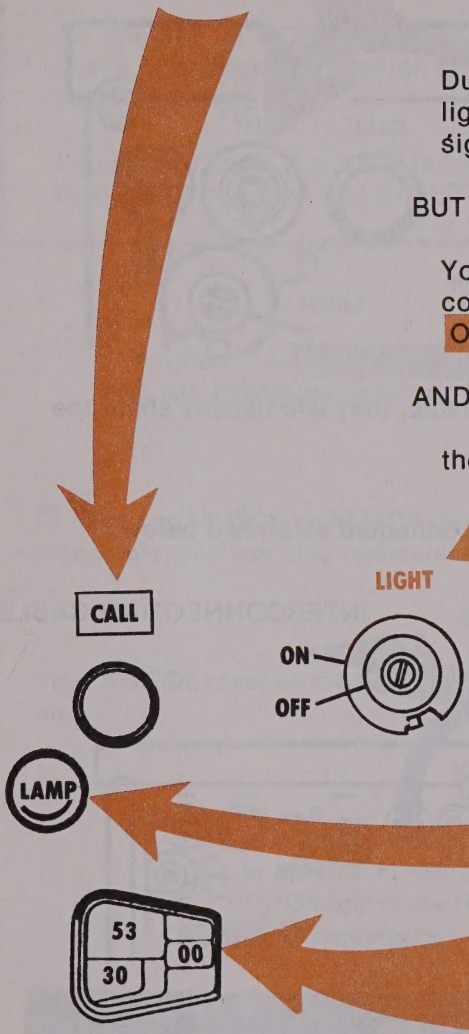
the LIGHT switch to ON.

LIGHT switch.

Controls power to DIAL WINDOW LAMP

AND

to squelch CALL lamp.



DIAL WINDOW LAMP.

Contains the lamp to light up the DIAL WINDOW.

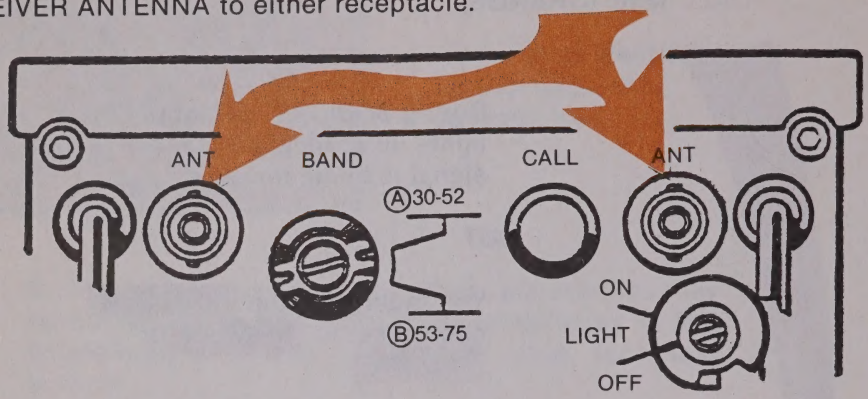
NOTE:

The lamps will light up only if you have the LIGHT switch at ON.

2-28. ANTENNA RECEPTACLES ON AUX RECEIVER (R-442(*)/VRC)

There are 2 ANT receptacles on each AUX RECEIVER.

They are connected in PARALLEL. This allows you to connect your AUX RECEIVER ANTENNA to either receptacle.

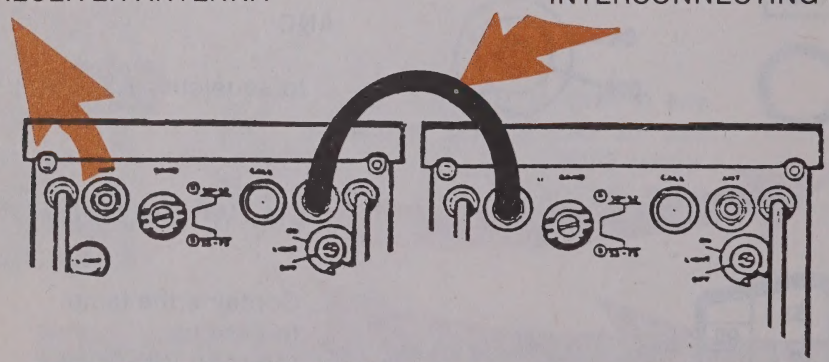


If you have 2 AUX RECEIVERS in your vehicle, they will usually share the same AUX RECEIVER ANTENNA.

The 2 AUX RECEIVERS may be connected as shown below.

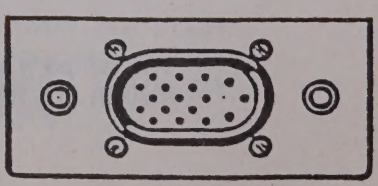
AUX RECEIVER ANTENNA

INTERCONNECTING CABLE



2-29. POWER/AUDIO RECEPTACLE ON AUX RECEIVER (R-442(*)/VRC

Plugs into the receptacle located on the AUX RECEIVER MOUNT. This is the main channel for AUX RECEIVER power and for the passage of AUX RECEIVER signals to equipment cabled to the underside of the AUX RECEIVER mount.



2-30. R-T X-MODE-NORMAL SWITCH

Every R-T and AUX RECEIVER has an X-MODE-NORMAL switch inside the radio.

CAUTION

An operator is NOT allowed to open any R-T or AUX RECEIVER to check or change the position of this switch. This is a job for C-E ORG MAINTENANCE.

BUT

You should know that there is such a switch inside every R-T and AUX RECEIVER and how this switch affects your communications.

Position of the X-MODE-NORMAL switch inside your R-T.
FOR ALL COMMUNICATIONS, THE SWITCH IS LEFT IN X-MODE.

and

- When no VINSON or NESTOR cables are connected to your R-T X-MODE receptable, you can only communicate in PLAIN (not secure).

BUT

Your X-MODE cover on the R-T X-MODE receptacle must be tightly screwed on.

NOTE:

The X-MODE cover has wiring which allows your R-T to operate PLAIN (NORMAL) when VINSON or NESTOR cables are NOT connected to your R-T X-MODE receptacle.

- When you have VINSON or NESTOR COMSEC equipment connected to you R-T through the X-MODE receptacle, you can communicate PLAIN (not secure/NORMAL) or CIPHER (secure/X-MODE) by using the controls on the VINSON or NESTOR COMSEC equipment. You do not have to disconnect cables, or open up the R-T or screw on the X-MODE cover.

2-31. AUX RECEIVER X-MODE NORMAL SWITCH

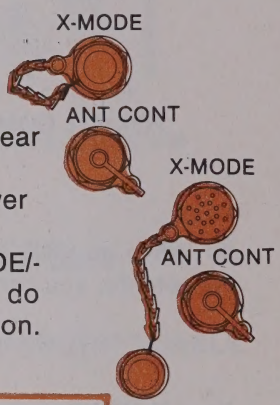
Position of the X-MODE-NORMAL switch inside your AUX RECEIVER.

- When any AUX RECEIVER is installed on a VINSON AUX RECEIVER MOUNT:

  The internal X-MODE-NORMAL switch must be in the X-MODE position.

- When any AUX RECEIVER is installed on a regular AUX RECEIVER MOUNT:

  The internal X-MODE-NORMAL switch must be in the NORMAL position.



RT X MODE SWITCH CHECK

Key and talk into the audio accessory. You should hear your sidetone.
While talking remove the X MODE connector cover (with the wire straps in it).
If you do not hear your sidetone now, the X-MODE/-NORMAL switch is in the X-MODE position. If you do hear the sidetone, the switch is in NORMAL position.

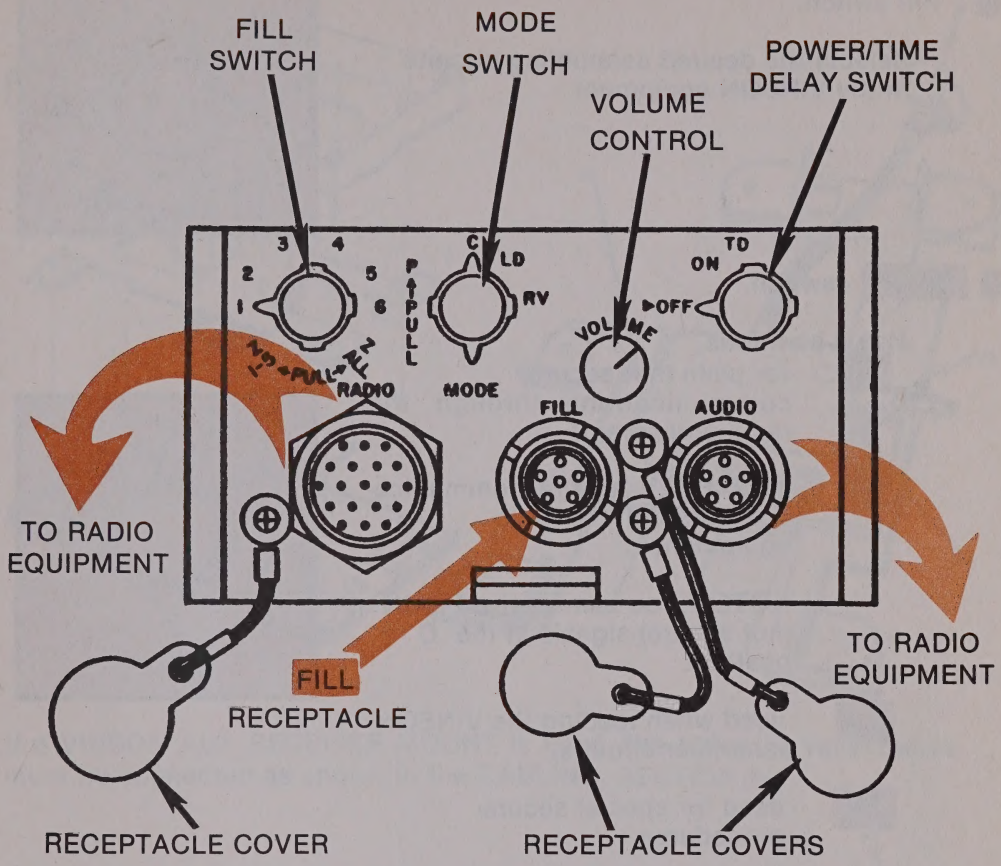
CAUTION

REMEMBER, YOU ARE NOT AUTHORIZED TO OPEN AN AUX RECEIVER TO CHECK OR CHANGE THE POSITION OF THE SWITCH.

THIS IS A JOB FOR C-E ORG MAINTENANCE.

- Before you start on a mission, have C-E ORG MAINT check your R-T's and AUX RECEIVER for the proper position of the internal X-MODE-NORMAL switch.

2-32. OPERATOR'S CONTROLS AND RECEPTACLES ON VINSON COMSEC EQUIPMENT (TSEC/KY-57)



- RECEPTACLES

  RADIO and AUDIO receptacles are connected by cables to the radio equipment.

  FILL receptacle is used with special equipment to load/change the VINSON "scrambling" circuits.

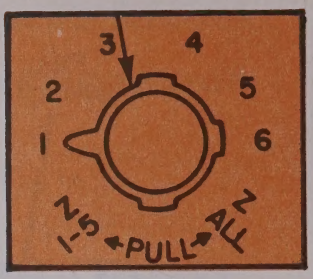
NOTE:

When cables are removed from any of the three receptacles, cover the receptacle with its cover.

2-32. OPERATOR'S CONTROLS AND RECEPTACLES ON VINSON COMSEC EQUIPMENT (TSEC/KY-57) - Continued

- Fill switch.

  Selects the desired scrambling circuits in the VINSON equipment.



- MODE switch.

  Has 4 positions.

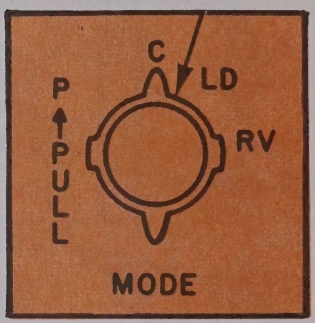
  P — for plain (not secure) communications through the radio equipment.

  C — for CIPHER (secure) communications through the radio equipment.

  NOTE: You can receive PLAIN (not secure) signals in the C position.

  LD — used when loading the VINSON scrambler circuits.

  RV — used for special secure procedures.



- VOLUME control.

  May be used with the other volume controls on the radio and intercom equipment.

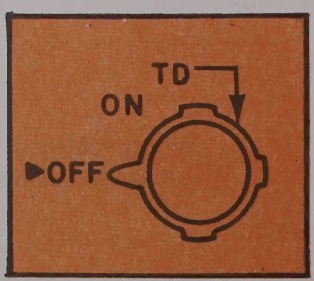
- POWER/TIME DELAY SWITCH.

  Has 3 positions.

  ON — applies power to VINSON equipment.

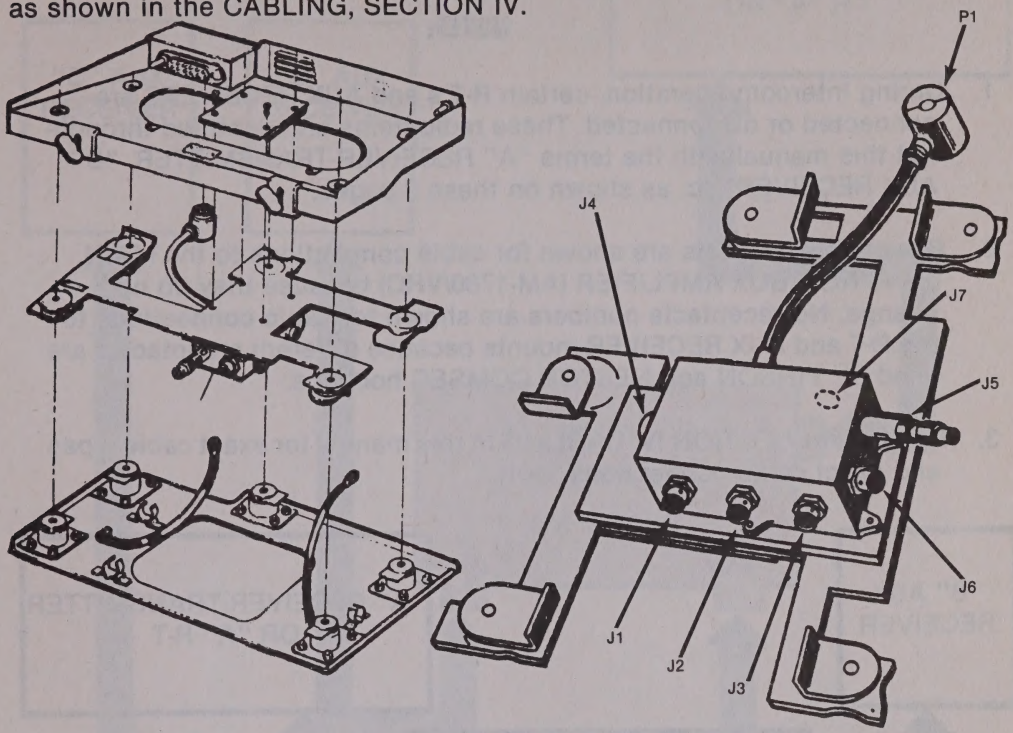
  OFF — removes power.

  TD — provides time delay operation.

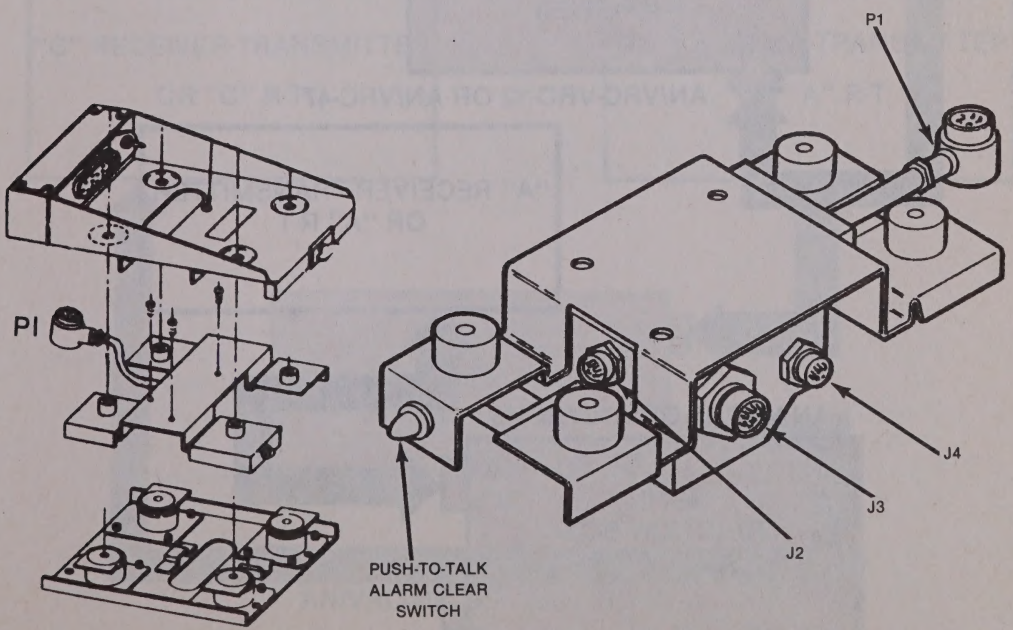


2-33. RECEPTACLES ON RADIO EQUIPMENT FOR CONNECTING VINSON COMSEC EQUIPMENT

The following receptacles on the VINSON R-T MOUNT must be connected as shown in the CABLING, SECTION IV.



If a VINSON AUX RECEIVER MOUNT is used, the following receptacles must be connected as shown in the CABLING, SECTION IV.



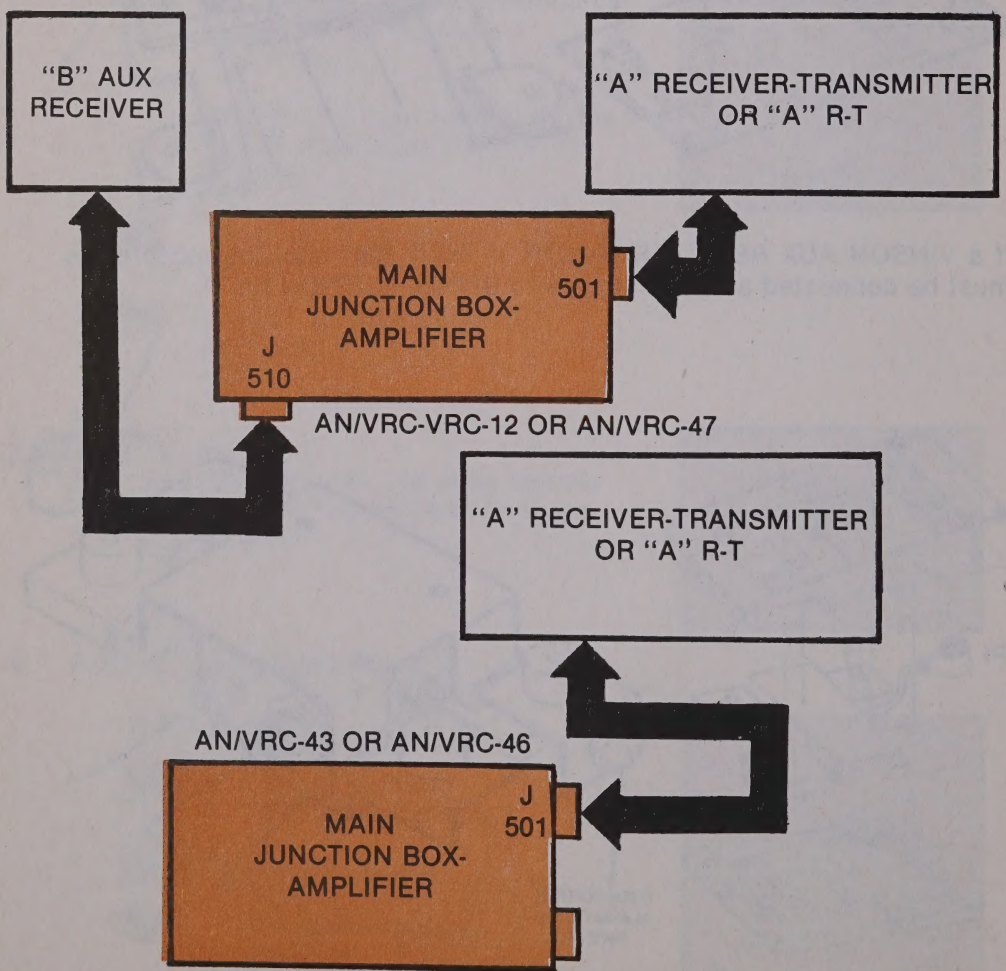
2-34. IDENTIFICATION OF OPERATOR'S RECEPTACLES FOR INTERCOM OPERATION

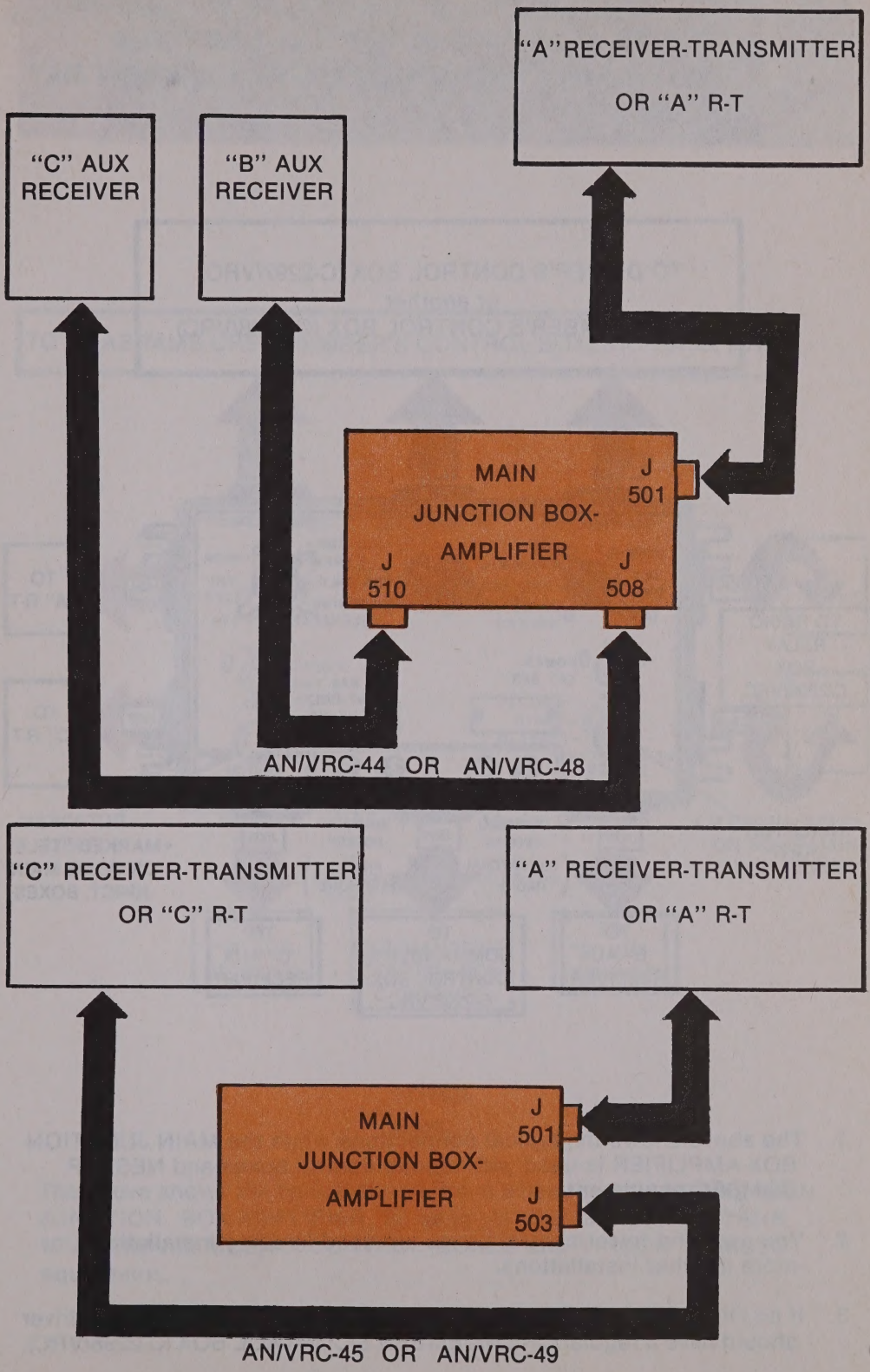
NOTES:

1. During intercom operation, certain R-T's and AUX RECEIVERS are connected or disconnected. These radio items are identified throughout this manual with the terms "A" RECEIVER-TRANSMITTER, "B" AUX RECEIVER etc. as shown on these 2 pages.

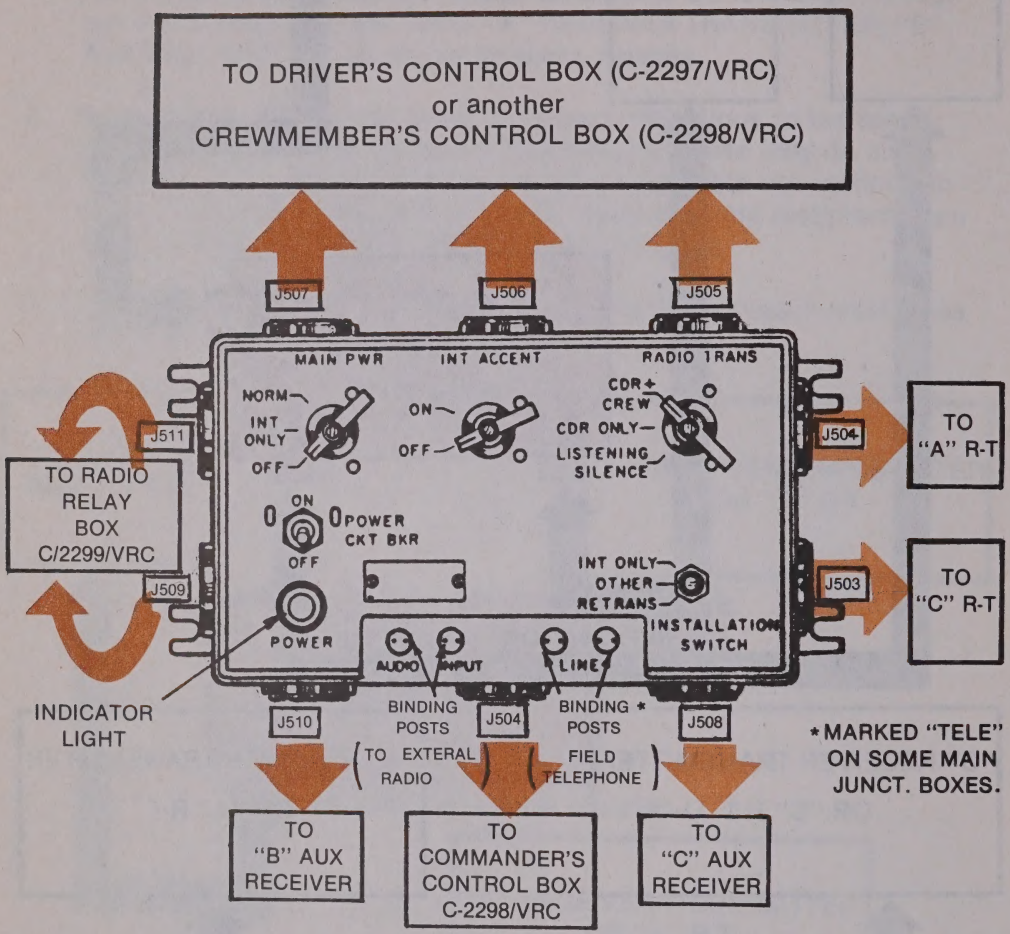
2. Receptacle numbers are shown for cable connections to the MAIN JUNCTION BOX-AMPLIFIER (AM-1780/VRC) because they do not change. No receptacle numbers are shown for cable connections to the R-T and AUX RECEIVER mounts because different receptacles are used for VINSON and NESTOR COMSEC hookups.

3. Refer to the SECTION IV, CABLING in this manual for exact cable types and exact cable connections.




"A" RECEIVER-TRANSMITTER
OR "A" R-T
"C" AUX RECEIVER
"B" AUX RECEIVER
MAIN JUNCTION BOX-AMPLIFIER
J 501
J 510
J 508
AN/VRC-44 OR AN/VRC-48
"C" RECEIVER-TRANSMITTER
OR "C" R-T
"A" RECEIVER-TRANSMITTER
OR "A" R-T
MAIN JUNCTION BOX-AMPLIFIER
J 501
J 503
AN/VRC-45 OR AN/VRC-49

2-35. OPERATOR'S CONTROLS, INDICATORS, RECEPTACLES AND CONNECTIONS ON MAIN JUNCTION BOX-AMPLIFIER (AM-1780/VRC) WHEN NESTOR COMSEC EQUIPMENT MAY BE USED



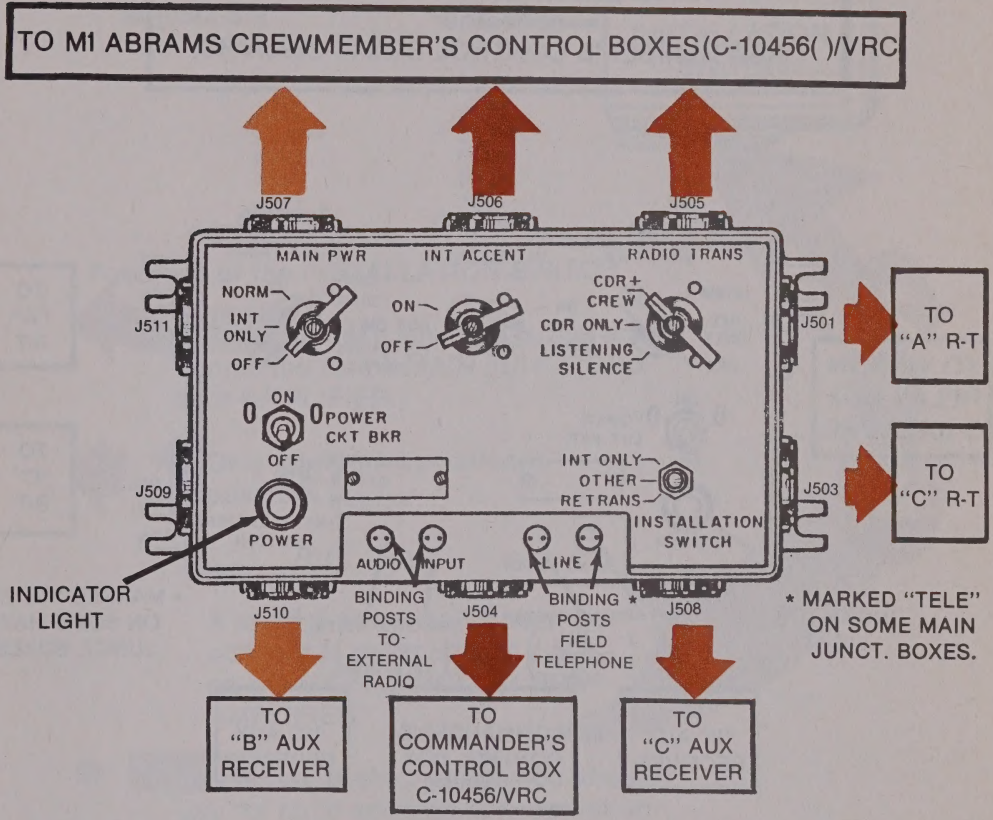
NOTES:

1. The above shows the typical connections when the MAIN JUNCTION BOX-AMPLIFIER is used with regular control boxes and NESTOR COMSEC equipment.

2. You may find fewer control boxes are used in some installations, or more in other installations.

3. If an OUTSIDE CONTROL BOX (C-2296/VRC) is not authorized, a driver should have a regular CREWMEMBER'S CONTROL BOX (C-2298/VRC).

2-36. OPERATOR'S CONTROLS, INDICATORS, RECEPTACLES AND CONNECTIONS ON XM 1 MAIN JUNCTION BOX-AMPLIFIER IN THE XM 1 TANK WHEN VINSON COMSEC EQUIPMENT MAY BE USED



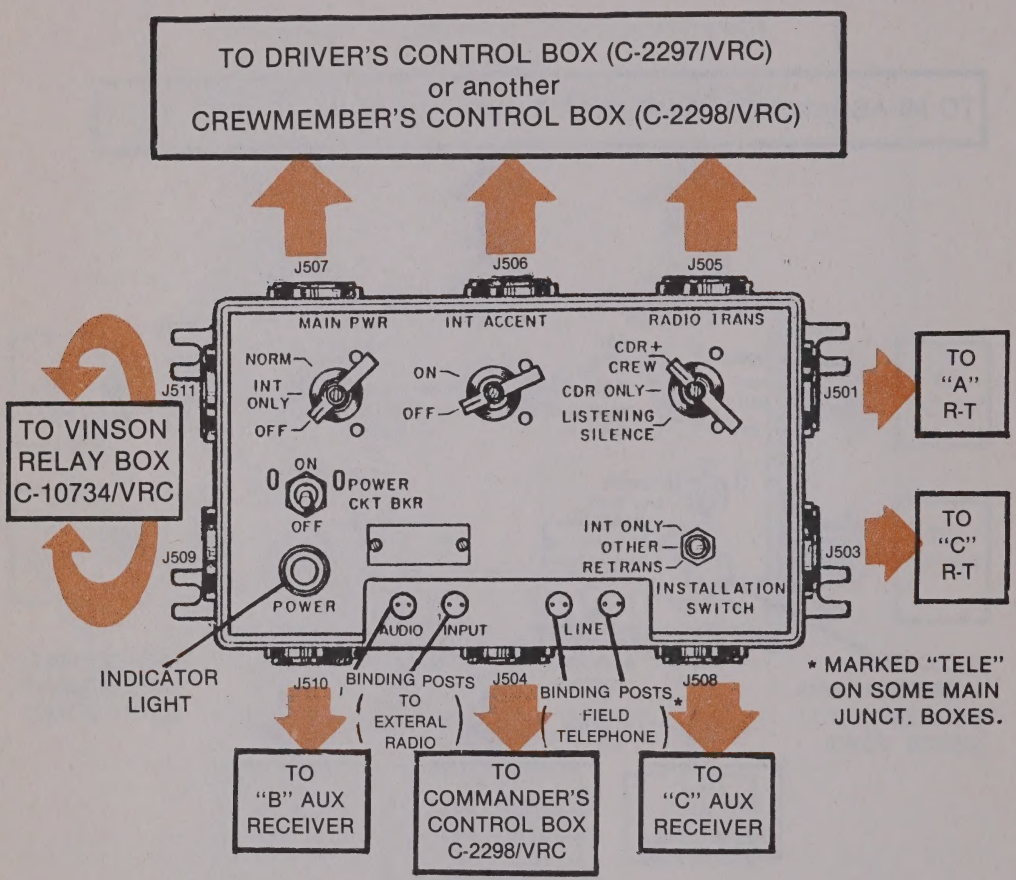
NOTE:

The above shows the typical connections when the M1 ABRAMS MAIN JUNCTION BOX-AMPLIFIER is used in the M1 ABRAMS TANK with CREWMEMBER'S CONTROL BOXES and VINSON COMSEC equipment.

2-37 OPERATOR'S CONTROLS, INDICATORS, RECEPTACLES AND CONNECTIONS ON MAIN JUNCTION BOX-AMPLIFIER WHEN VINSON COMSEC EQUIPMENT MAY BE USED

NOTE:

This applies to all hookups involving VINSON COMSEC equipment except the M1 ABRAMS TANK.



NOTES:

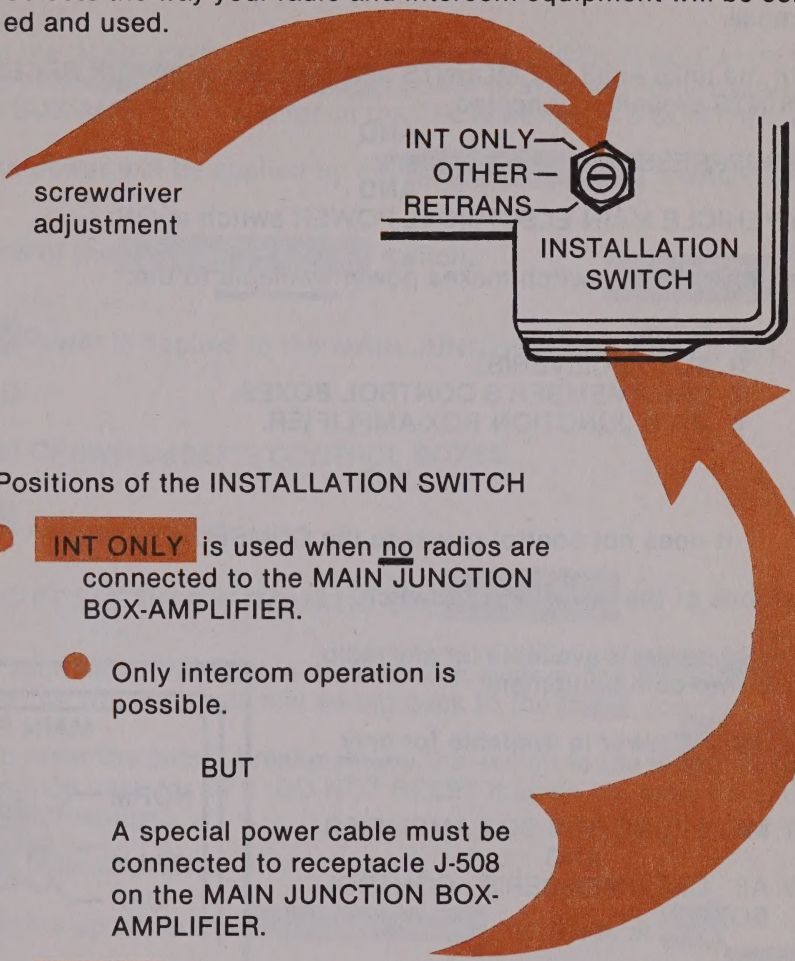
1. You may find fewer crewmember control boxes in some installations, or more in other installations.

2. If an OUTSIDE CONTROL BOX (C-2296/VRC) is not authorized, a driver should have a regular CREWMEMBER'S CONTROL BOX (C-2298/VRC).

2-38. INSTALLATION SWITCH ON MAIN JUNCTION BOX-AMPLIFIER

Purpose:

Selects the way your radio and intercom equipment will be controlled and used.



Positions of the INSTALLATION SWITCH

- INT ONLY is used when no radios are connected to the MAIN JUNCTION BOX-AMPLIFIER.
  - Only intercom operation is possible.

    BUT

    A special power cable must be connected to receptacle J-508 on the MAIN JUNCTION BOX-AMPLIFIER.
- OTHER This is the position you should use for radio and intercom operation.

  WITH

  The audio accessories connected to the CREWMEMBER'S CONTROL BOXES controlling the radio and intercom communications.
- RETRANS For radio relay (retransmission operation) when the R-T's in Radio Set AN/VRC-45 or AN/VRC-49 are connected to the MAIN JUNCTION BOX-AMPLIFIER using a RADIO RELAY BOX (C-2299/VRC).

2-39. MAIN PWR SWITCH ON MAIN JUNCTION BOX-AMPLIFIER

Purpose.

With the links in all R-T MOUNTS and the links in all AUX RECEIVER MOUNTS properly connected,

AND

the SUPPRESSOR working properly

AND

the VEHICLE MAIN ELECTRICAL POWER switch at ON:

The MAIN PWR switch makes power available to the:

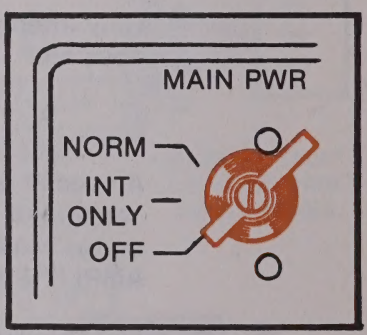
- R-T(S).
- AUX RECEIVER(S).
- CREWMEMBER'S CONTROL BOXES.
- MAIN JUNCTION BOX-AMPLIFIER.

BUT

It does not control power to the COMSEC equipment.

Positions of the MAIN PWR switch.

- OFF No power is available for any radio and intercom equipment.
- INT ONLY Power is available for only the:
  - MAIN JUNCTION BOX AMPLIFIER
    AND
  - All CREWMEMBER'S CONTROL BOXES.
- NORM Power is available for the:
  - R-T(S).
  - AUX RECEIVER(S).
  - All CREWMEMBER'S CONTROL
  - BOXES.
  - MAIN JUNCTION BOX-AMPLIFIER.



NOTE:

Remember, the MAIN PWR switch only makes power available to radio and intercom equipment. Power is applied by other controls.

2-40. POWER CKT BKR SWITCH AND POWER INDICATOR LAMP ON MAIN JUNCTION BOX-AMPLIFIER

Purpose.

When the MAIN PWR swtich on the MAIN JUNCTION BOX-AMPLIFIER is set to either INT ONLY or NORM, power is available for the MAIN JUNCTION BOX-AMPLIFIER and for all the CREWMEMBER'S CONTROL BOXES.

This power will be applied by the POWER CKT BRK switch.

Positions of the POWER CKT BKR switch.

- ON Power is applied to the MAIN JUNCTION BOX-AMPLIFIER

  AND

  to all CREWMEMBER'S CONTROL BOXES.

- OFF removes power.

- CIRCUIT BREAKER AUTOMATIC OPERATION.

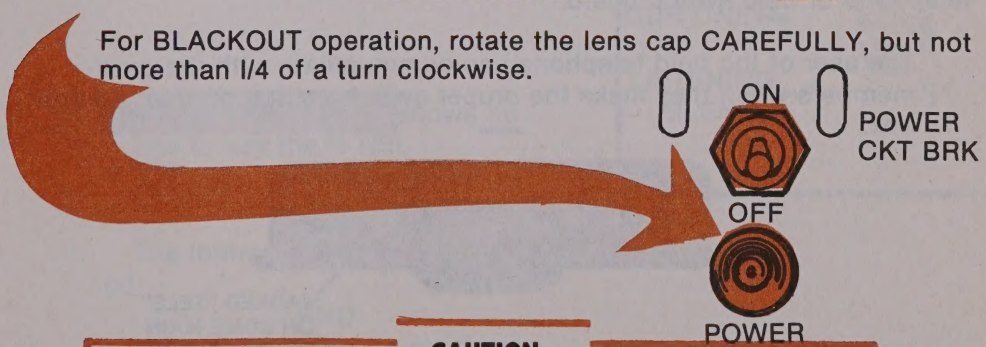
  If there is an overload in the intercom system, the POWER CKT BKR switch will automatically spring back to the OFF position.

  To reset the circuit breaker, move the switch to the ON position. If it springs back to OFF DO NOT RESET it again because troubleshooting is required.

POWER indicator lamp.

Lights up when the POWER CKT BKR switch is at ON.

For BLACKOUT operation, rotate the lens cap CAREFULLY, but not more than l/4 of a turn clockwise.



CAUTION

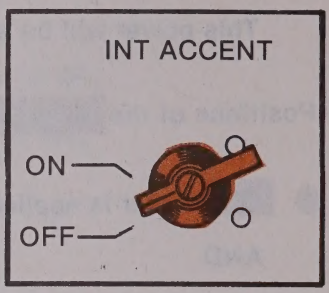
If you force the lens cap too far in either direction, you may damage the bulb socket causing a short circuit.

2-41. INT ACCENT SWITCH ON MAIN JUNCTION BOX-AMPLIFIER

Purpose.

Controls the loudness of signals heard at the audio accessories connected to the CREWMEMBER'S CONTROL BOXES.

Positions.



- OFF Radio and intercom signals are not affected.
- ON When the intercom is keyed by any crewmember, the radio signals are reduced in loudness so you can hear the intercom signals more clearly.

  AND

  When the intercom is unkeyed, the radio signals return to their original loudness.

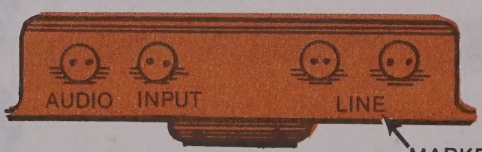
2-42. AUDIO INPUT AND LINE BINDING POSTS ON MAIN JUNCTION BOX-AMPLIFIER

AUDIO INPUT binding posts provide connection to an external receiver.

Crewmembers can hear this receiver by making the proper selection on their CREWMEMBER'S CONTROL BOX.

LINE (TELE) binding posts provide connection by field wire to a field telephone or field switch board.

The user of the field telephone can communicate with the crewmembers when they make the proper switch setting on their control box.



MARKED "TELE" ON SOME MAIN JUNCT. BOXES.

NOTE:

Remember, the binding posts on an M1 ABRAMS MAIN JUNCTION BOX AMPLIFIER are fatter than those on a regular MAIN JUNCTION BOX AMPLIFIER.

2-43. RADIO TRANS SWITCH ON MAIN JUNCTION BOX-AMPLIFIER

Purpose.

This switch selects which crewmembers can key the transmitter section of the R-T(s) using their audio accessories connected to the CREWMEMBER'S CONTROL BOX.

NOTE: This switch DOES NOT AFFECT radio signals being received

and

the use of the intercom system.

Positions of the RADIO TRANS switch.

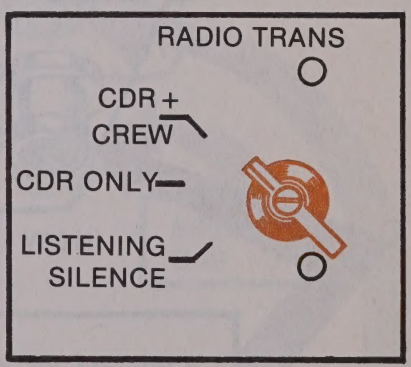
- CDR + CREW allows all crewmembers and the command to key the R-T(S).
- CDR ONLY allows only the commander of the crew to key the R-T(S).
- LISTENING SILENCE allows no one to key the R-T(S).

BUT

The intercom system may be used

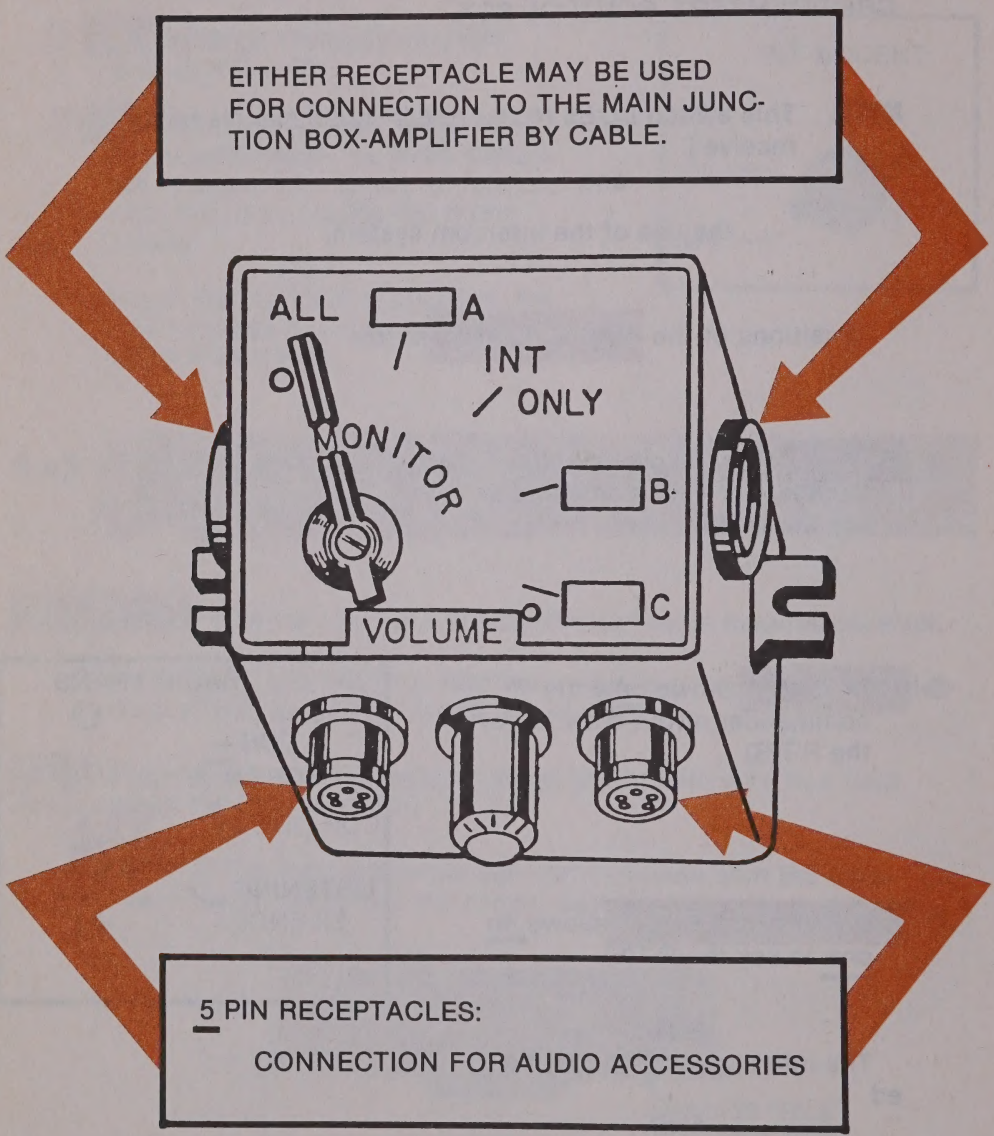
AND

radio signals may be received.



2-44. RECEPTACLES ON CREWMEMBER'S CONTROL BOX

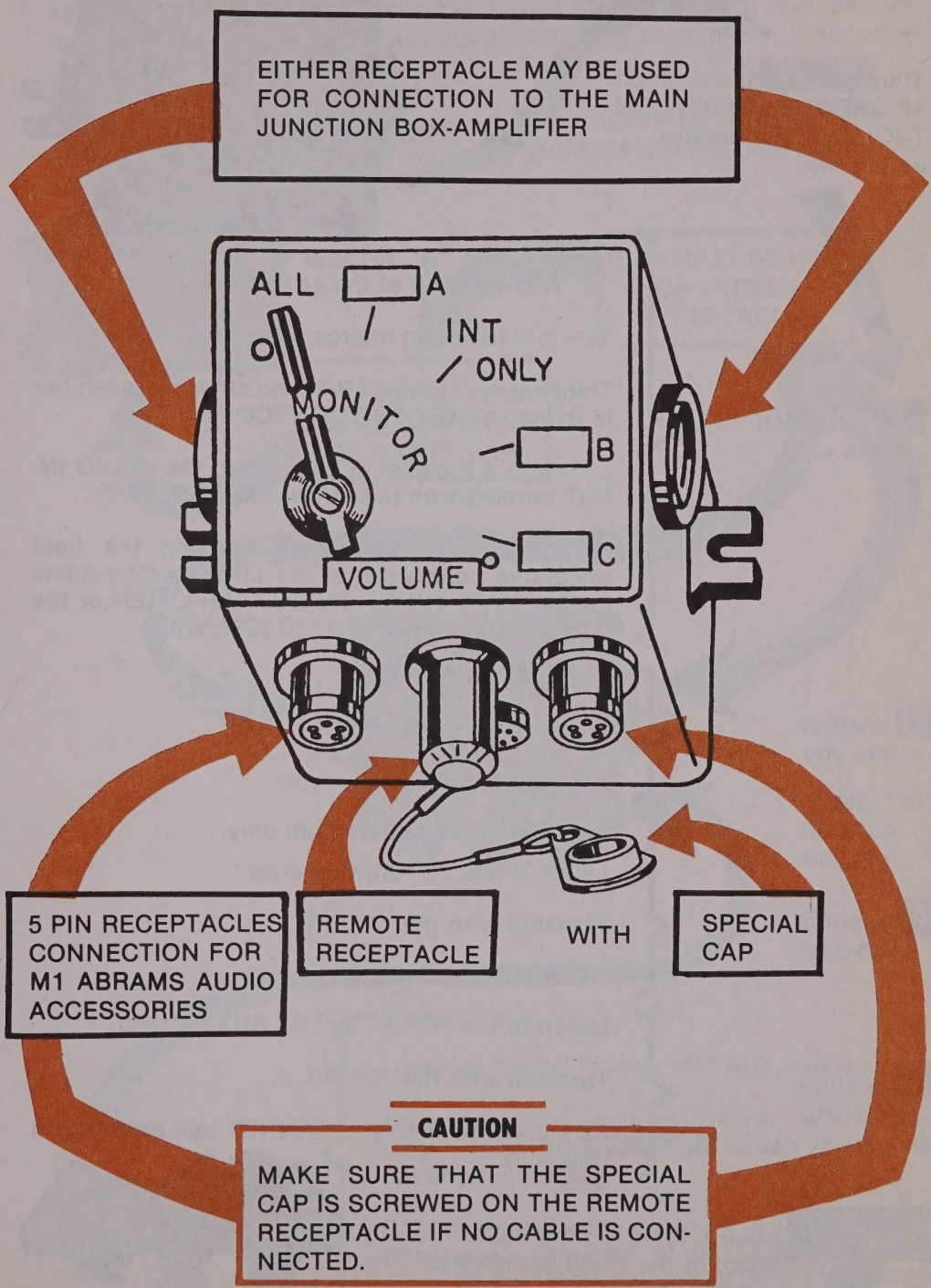
Remember, there are two types of CREWMEMBER'S CONTROL BOXES:



Regular CREWMEMBER'S CONTROL BOX (C-2298/VRC)

2-44. RECEPTACLES ON CREWMEMBER'S CONTROL BOX - Continued

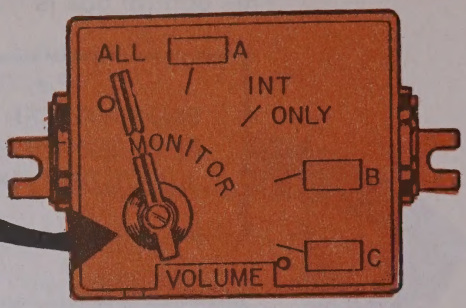
This control box is used in the M1 ABRAMS TANK.



M1 ABRAMS CREWMEMBER'S CONTROL BOX (C-10456( )/VRC)

2-45. OPERATOR'S CONTROLS ON CREWMEMBER'S CONTROL BOX

The **MONITOR** switch on all CREWMEMBER'S CONTROL BOXES operates as follows:



ALL position lets you

- Listen to the "A" R-T and "B" AUX receiver and "C" AUX receiver at the same time.
- Talk and listen on intercom.
- Transmit with the "A" R-T if no other crewmember is trying to "KEY THE INTERCOM".
- Listen to a receiver connected to the AUDIO INPUT terminals on the MAIN JUNCTION BOX.
- Communicate with a person using the field telephone connected to the LINE binding posts on the MAIN JUNCTION BOX-AMPLIFIER or the OUTSIDE CONTROL BOX (C-2296/VRC).

A position lets you

- Listen to the "A" R-T.
- Transmit with the "A" R-T.
- Talk and listen on intercom.

INT ONLY position lets you

- Talk and listen on intercom only.

B position lets you

- Listen to the "B" AUX receiver.
- Transmit with the "A" R-T.
- Talk and listen on intercom.

C position lets you

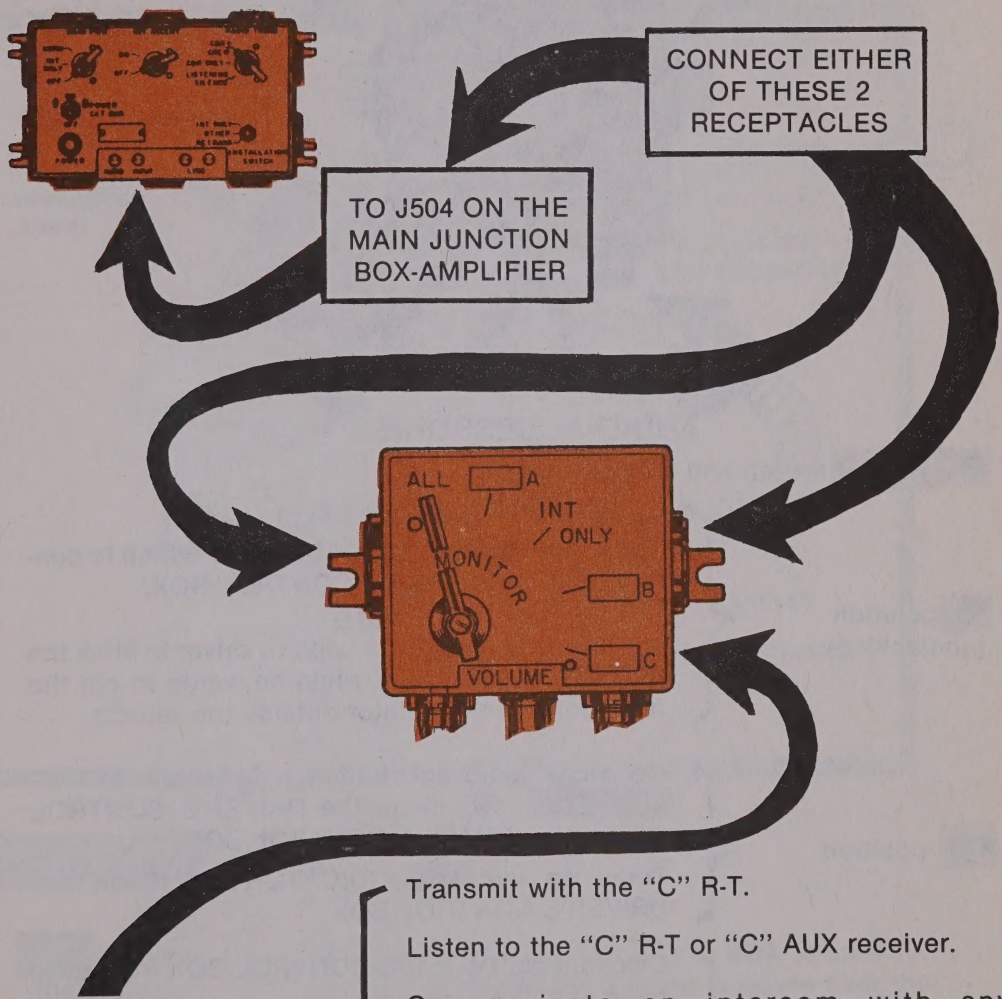
- Listen to the "C" R-T or "C" AUX receiver.
- Transmit with the "C" R-T.
- As a crewmember, you CANNOT talk or listen on intercom.

VOLUME control for adjusting audio heard in the audio accessory.

2-46. OPERATOR'S CONTROLS ON COMMANDER'S CONTROL BOX

When a regular CREWMEMBER'S CONTROL BOX (C-2298/VRC) or an M1 ABRAMS CREWMEMBER'S CONTROL BOX (C-10456( )/VRC) is connected to receptacle J504 on the MAIN JUNCTION BOX-AMPLIFIER, it becomes a COMMANDER'S CONTROL BOX.

All positions on the MONITOR switch on the COMMANDER'S CONTROL BOX operate the same as they did on the CREWMEMBER'S CONTROL BOX except for position C.



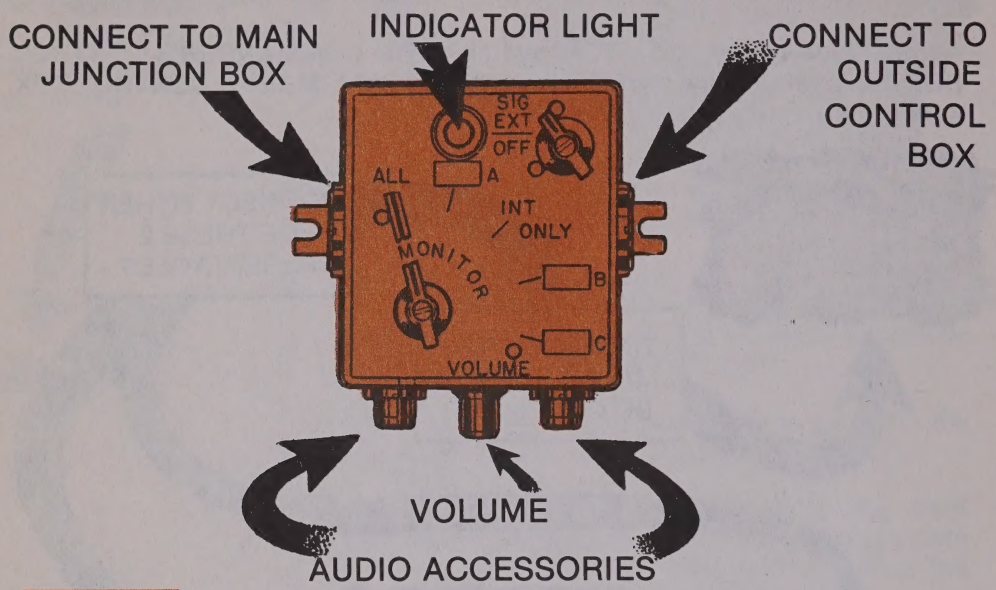
In position C the COMMANDER can:

- Transmit with the "C" R-T.
- Listen to the "C" R-T or "C" AUX receiver.
- Communicate on intercom with any crewmember the MONITOR switch of which is not at position C.
- Communicate with a person using the field telephone connected to the LINE binding posts on the MAIN JUNCTION BOX-AMPLIFIER or OUTSIDE CONTROL BOX.

2-47. OPERATOR'S CONTROLS, INDICATORS AND RECEPTACLES ON DRIVER'S CONTROL BOX (C-2297/VRC)

NOTE

All positions of the MONITOR switch operate the same as the MONITOR switch on a CREWMEMBER'S CONTROL BOX.



SIG-EXT-OFF switch and indicator light

SIG position (nonlocking)

Turns on indicator light next to switch.

Turns on the OUTSIDE CALL LAMP which is connected to the OUTSIDE CONTROL BOX.

NOTE:

This position is used by driver to blink the OUTSIDE CALL LAMP when he wants to get the attention of the operator outside the vehicle.

EXT position

Connects radio and intercom functions of the **MONITOR** switch on the DRIVER'S CONTROL BOX to the OUTSIDE CONTROL BOX.

Turns on the **EXT** INDICATOR LIGHT on the DRIVER'S CONTROL BOX.

OFF position

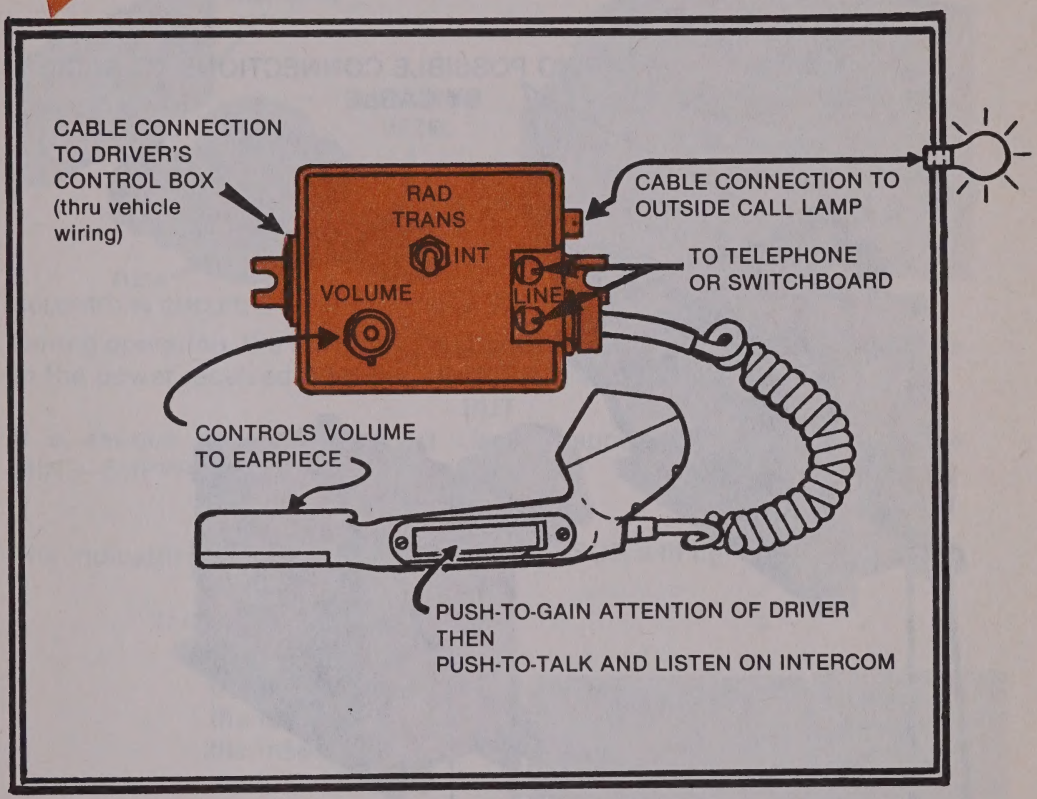
Disconnects OUTSIDE CONTROL BOX from your radio and intercom.

NOTE:

This position lets the OUTSIDE CONTROL BOX operator get the attention of the DRIVER by pressing his push-to-talk switch which will cause the DRIVER'S CONTROL BOX **EXT** INDICATOR LIGHT to glow.

2-48. OPERATOR'S CONTROLS, INDICATORS AND RECEPTACLES ON OUTSIDE CONTROL BOX (C-2296/VRC)

COMMUNICATIONS BOX ON THE OUTSIDE OF THE VEHICLE (CONTAINS THE OUTSIDE CONTROL BOX, OUTSIDE CALL LAMP AND HANDSET)


CABLE CONNECTION TO DRIVER'S CONTROL BOX (thru vehicle wiring)
RAD TRANS
INT
VOLUME
LINE
CABLE CONNECTION TO OUTSIDE CALL LAMP
TO TELEPHONE OR SWITCHBOARD
CONTROLS VOLUME TO EARPIECE
PUSH-TO-GAIN ATTENTION OF DRIVER THEN PUSH-TO-TALK AND LISTEN ON INTERCOM

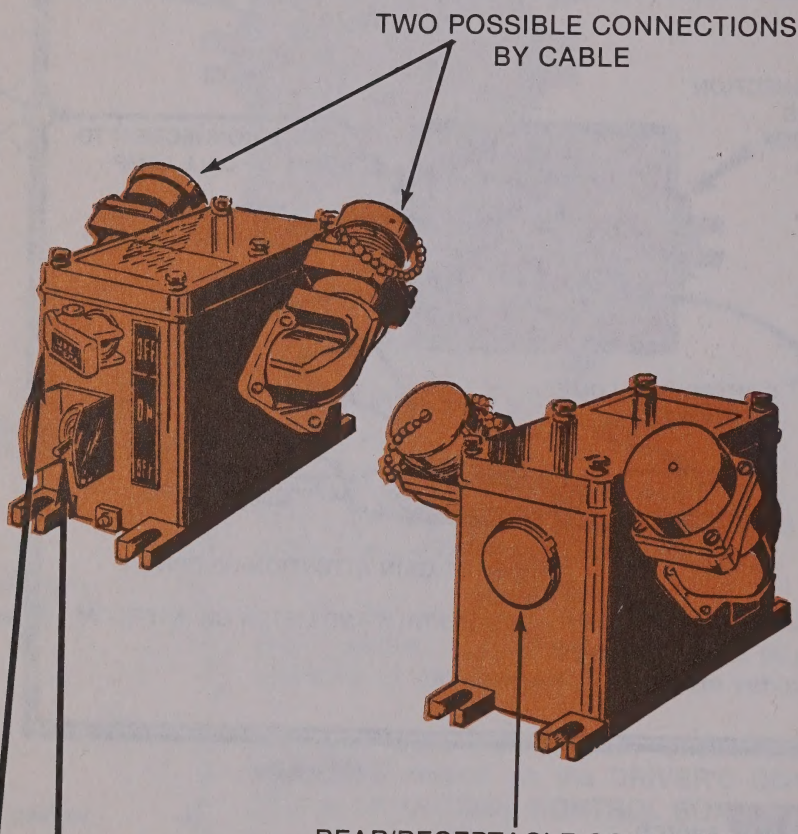
RAD TRANS-INT switch

INT position (not spring loaded) — Handset of OUTSIDE CONTROL BOX is used for push-to-talk and listen communications over the vehicle intercom system.

RAD TRANS position (spring loaded) — Handset of OUTSIDE CONTROL BOX is used for push-to-talk and release-to-listen communication over the radio selected by the driver.

2-49. OPERATOR'S CONTROLS, INDICATORS AND RECEPTACLES ON SUPPRESSOR, ELECTRICAL TRANSIENT (MX-7777(*)/GRC)

Purpose: Protects your equipment from damage when too much power reaches the SUPPRESSOR.



CIRCUIT BREAKER switch goes to OFF when too much power reaches the SUPPRESSOR.

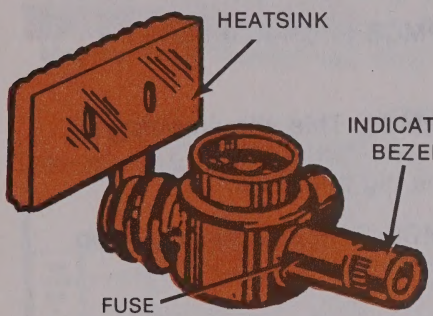
BATTLE OVERRIDE CIRCUIT BREAKER switch is used in an emergency to override the switch when it is in the OFF position.

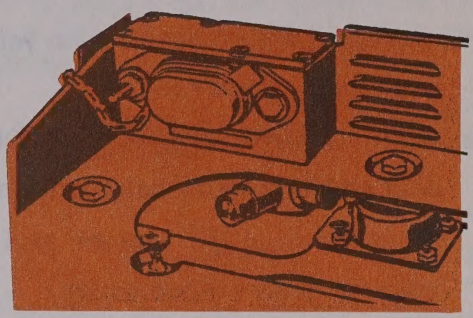
2-50. OPERATOR'S INDICATORS ON THE MINI—SUPPRESSOR

In some installations, the MINI—SUPPRESSOR is used in place of SUPPRESSOR, ELECTRICAL TRANSIENT (MX-7777(*)/VRC).

There are NO controls or adjustments on the MINI—SUPPRESSOR.

The MINI—SUPPRESSOR is installed in either an AUX RECEIVER or R-T MOUNT.





During operation, the MINI-SUPPRESSOR circuits get rid of power changes in the power received from the VEHICLE MAIN POWER source.

BUT

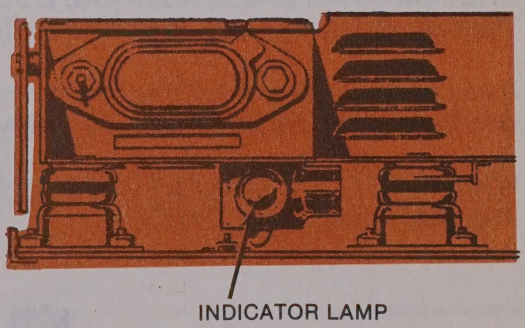
If a serious overload or short circuit happens, the fuse inside the MINI—SUPPRESSOR will blow.

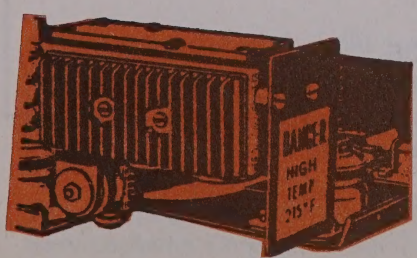
AND

The indicator lamp on the MINI—SUPPRESSOR will light.

This light tells you:

- You have no protection for the radios and the intercom equipment.
  AND
- You should call C-E ORG MAINT to replace the MINI-SUPPRESSOR.





WARNING

KEEP YOUR HANDS OFF THE FINS AND HEAT SHIELD ON THE MINI—SUPPRESSOR. THEY GET VERY HOT AND YOU CAN GET A SERIOUS BURN FROM THEM.

SECTION II
PREVENTIVE MAINTENANCE CHECKS AND SERVICES

2-51. GENERAL

To be sure that equipment is always ready for your mission, you must do scheduled PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS).

BEFORE OPERATION, perform your B PMCS to be sure that your equipment is ready to go.

DURING OPERATION, perform your D PMCS. This should help you spot small problems before they become big problems.

AFTER OPERATION, perform your A PMCS. This should help keep your equipment in top shape.

WEEKLY AND MONTHLY PMCS are important checks you make to keep serious problems from suddenly happening.

ROUTINE CHECKS like:

CLEANING, DUSTING, WASHING, CHECKING FOR FRAYED CABLES, STOWING ITEMS NOT IN USE, COVERING UNUSED RECEPTACLES AND CHECKING FOR LOOSE NUTS AND BOLTS are not listed as PMCS checks. They are things that you should do anytime you see they must be done.

If you find a routine check like one of those above is listed in your PMCS, it was listed because other operators reported problems with this item.

WHEN YOU ARE DOING ANY PMCS OR ROUTINE CHECKS, KEEP IN MIND THE WARNINGS AND CAUTIONS.

NOTE

The PROCEDURES column in your PMCS Chart instructs you to "CHECK AND HAVE REPAIRED OR ADJUSTED AS NECESSARY". Carefully follow these instructions, and remember, YOU are NOT authorized to open up any radio to make adjustments.

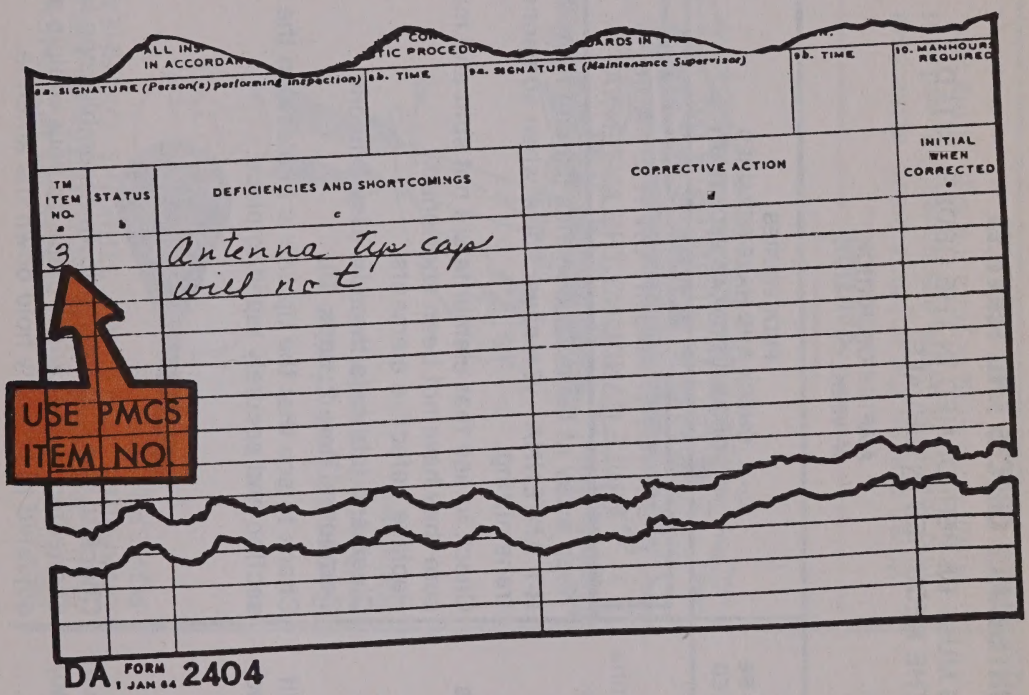
2-52. USE OF DA FORM 2404 WITH PMCS

NOTE

If your equipment must be in operation all the time, check and service those items that can be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shut down.

NOTE

Use the ITEM NO. column in your PMCS table to get the numbers for the TM ITEM NO. column on DA Form 2404 (Equipment Inspection and Maintenance Worksheet) when you fill out the form.



NOTE

The heading and other columns on DA Form 2404 should be filled out following the instructions in TM 38-750, The Army Maintenance Management System (TAMMS) and the special instructions from your commander.

CAUTION

REMEMBER: Call C-E ORG MAINTENANCE if you find loose nuts and bolts or any defects in your radios, antennas or control boxes.

NOTE

The PMCS and the criteria for READINESS REPORTING replace Equipment Serviceability Criteria (ESC). Do your PMCS carefully.

TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

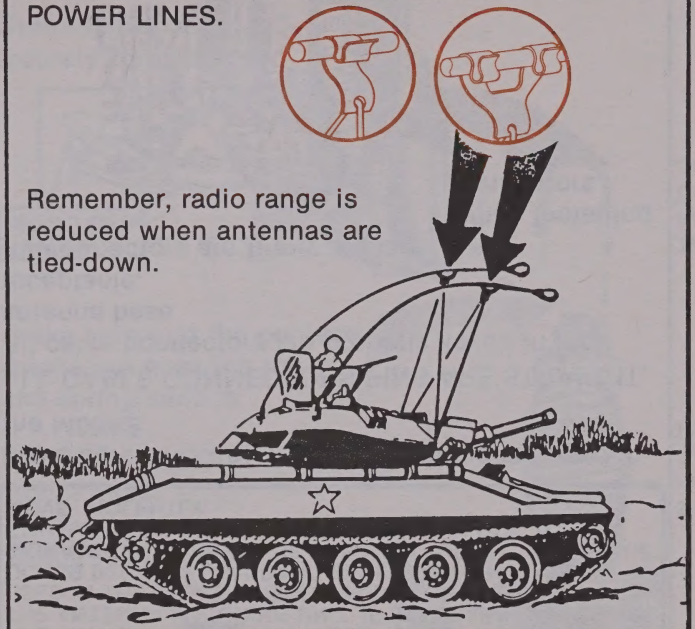
NOTE: ALL ITEMS MUST BE PERFORMED IN THE ORDER LISTED, AND AT THE REQUIRED INTERVALS.

B-BEFORE OPERATION
D-DURING OPERATION
A-AFTER OPERATION
W-WEEKLY
M-MONTHLY

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED	PROCEDURES CHECK AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	FOR READINESS REPORTING EQUIPMENT IS NOT READY AVAILABLE IF:
						All Antenna Systems	**WARNING** DO NOT TRANSMIT ON THE RADIO WHILE HANDLING THE ANTENNA. Keep away at least 7 7/8 inches (20 cm) from the R-T ANTENNA - you never know when someone is transmitting.	
1	*					Elements	Check to see that elements are not split and make sure they have not been shortened. Replace defective elements.	ANY ANTENNA ELEMENT IS SPLIT OR SHORTENED 6 OR MORE INCHES. THREADS ARE STRIPPED.
2					*	Element Threads	Clean and lubricate threads. (Use Silicone Compound item 2, appx. D).	
3	*	*				Tip Cap (if authorized)	Check to see that the tip cap is in place on the top section and securely taped in place.	
4	*	*				Tie-down (if authorized)	Check to see that the tie-down assembly rope is connected to the proper place on your vehicle and adjusted to properly hold down the antenna.	

PROPER POSITIONING FOR ROAD MOVEMENT-/RAIL CROSSING TO PREVENT ANTENNA FROM SNAPPING OUT AND STRIKING OVERHEAD POWER LINES.

Remember, radio range is reduced when antennas are tied-down.



TIE-DOWN is missing or improperly adjusted to hold antenna down while vehicle is in motion.

CAUTION

When pulling the antenna down, make sure that the tip is above any pedestrian and that it will not swing beyond the side of the vehicle.

Table 2-1. PMCS (continued)

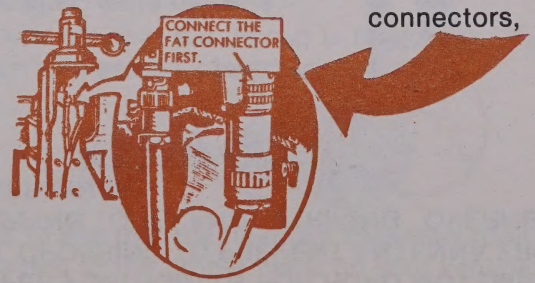
ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED	PROCEDURES CHECK AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	FOR READINESS REPORTING EQUIPMENT IS NOT READY AVAILABLE IF:
						Cables	**WARNING** TANK M60A2 USES SPECIAL PURPOSE CABLES TO CONNECT THE ANT CONT AND ANT RECEPTACLES ON THE R-T TO THE ANTENNA MATCHING UNIT. IF STANDARD CABLES ARE USED IN THE M60A2, SERIOUS INJURY OR EVEN DEATH CAN OCCUR BECAUSE STANDARD CABLES MAY RADIATE SIGNALS THAT CAN CAUSE THE MAIN TURRET AND/OR THE COMMANDER'S CUPOLA AND/ORTHE MAIN GUN TO MOVE VIOLENTLY.	
5		✸				Special Purpose Cables	Make sure SPECIAL PURPOSE cables are used in the M60A2.	STANDARD CABLES ARE FOUND IN PLACE OF SPECIAL PURPOSE CABLES. (APPLIES TO M60A2 ONLY.)
6		✸				Cable Connector Pins	ALL CABLE CONNECTORS PINS ARE STRAIGHT. All cable connectors are properly keyed in their antenna base receptacle. All connectors are firmly in place. When installing connectors,  	THE THIN CONNECTOR CANNOT BE CONNECTED TO THE BASE OF THE R-T ANTENNA MATCHING UNIT.

TABLE 2-1. PMCS (continued)

| | | |

TABLE 2-1. PMCS (continued)

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED	PROCEDURES CHECK AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	FOR READINESS REPORTING EQUIPMENT IS NOT READY/AVAILABLE IF:
						R-T Antenna Matching Units		
✸ 10					✸	Water Drain (on COMPACT and ROUND BASE ANTENNA MATCHING UNITS)	Drain all water trapped inside the mount.	

✸ DO THIS STEP AS SOON AS POSSIBLE AFTER FORDING OPERATIONS. ALSO WHEN YOU SUSPECT WATER MAY HAVE REACHED THE ANTENNA MATCHING UNIT.

| | | |

TABLE 2-1. PCMS (continued)

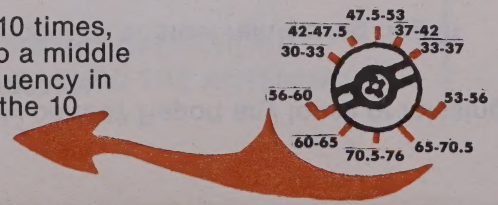
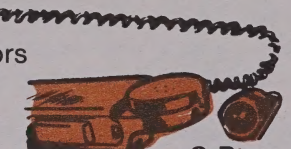
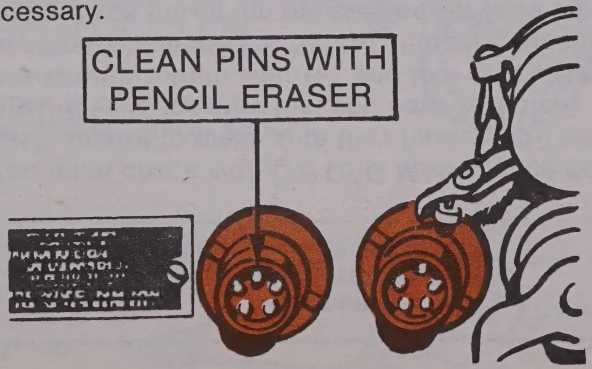
ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED	PROCEDURES CHECK AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	FOR READINESS REPORTING EQUIPMENT IS NOT READY AVAILABLE IF:
12					✸	Turning mechanish inside COMPACT ANTENNA MATCHING UNIT (MX-9146/VRC) or ROUND BASE ANTENNA MATCHING UNIT (MX-6707/VRC) or BOX BASE ANTENNA MATCHING UNIT (MX-2799/VRC).	Make sure that the electrical mechanical circuits inside the antenna matching units automatically work when you change from one group of frequencies to another group of frequencies. Start by selecting a test frequency in the middle of the first group of frequencies (30 mHz to 33 mHz) and tune the R-T to the test frequency. **NOTE:** Your R-T should be ON but you do not have to key the R-T. While tuning the R-T, have someone listen carefully at the side of the antenna matching unit for the sounds of the electrical-mechanical actions. Do this 10 times, tuning to a middle test frequency in each of the 10 groups. 	On Antenna Matching Unit MX-2799/VRC, the electrical-mechanical sounds cannot be heard as you go through every one of the ten test frequency tuning steps. OR On Antenna Matching Unit MX-9146/GRC and Antenna Matching Unit MX-6707/VRC, the electrical-mechanical sounds cannot be heard as you go through every one of the 10 test frequency tuning steps, AND you cannot change the circuits by turning the control at the bottom of the antenna matching unit because the control is broken or it cannot be reached.

TABLE 2-2. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

ITEM NO.	INTERVAL QUARTERLY	ITEM TO BE INSPECTED	PROCEDURES CHECK AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	FOR READINESS REPORTING EQUIPMENT IS NOT READY/AVAILABLE IF:
13	✸	R-T OUPUT POWER AND MATCHING UNIT	You must check with C-E ORG MAINT once during each quarter to make sure they have used Test Set AN/URM-182 to verify that you have sufficient power output from your R-T and that your antenna is properly matched to the R-T. Proper matching will get you maximum radiated power from the antenna connected to the R-T.	C-E ORG MAINT is not available or able to do the necessary tests. A mismatch in frequency and antenna length can cause damage tothe RT.

TABLE 2-1. PCMS (continued)

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED	PROCEDURES CHECK AND HAVE REPAIRED OR ADJUSTED AS NECESSARY
						AUDIO ACCESSORIES	
14						O-Rings	Audio connectors have a good O-Ring. 
15						Lubrication	O-Ring has a light coat of silicone compound. Use (item 2, appx. D).
						Moisture Barriers	If used, moisture barriers are in place.
							Check for corrosion. Clean with pencil eraser if necessary. 

18	✸	✸	ALL R-T and AUX RECEIVER MOUNTS	Connections

CAUTION

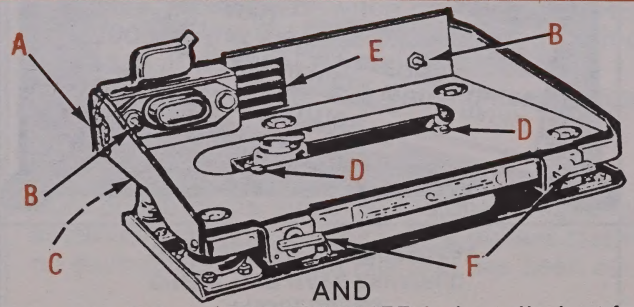
BEFORE REMOVING OR INSTALLING ANY RADIO EQUIPMENT, MAKE SURE THAT ALL RADIO AND INTERCOM POWER SWITCHES ARE OFF.

Before insalling an R-T or AUX receiver on its mount, make sure that:

- **A** Receptacle cover is removed and chain is not caught between guide pin and receptacle.
- **B** Both mount guide pins are straight.
- **C** Unused underside receptacles are covered.
- **D** Grounding straps are securely connected between top tray and mount base.
- **E** Vent port area is free of obstructions.

CAUTION

ON EARLY MODEL R-T MOUNTS, A SPECIAL VENT COVER IS PROVIDED. THIS VENT COVER MUST BE INSTALLED WHEN SET IS IN OPERATION.



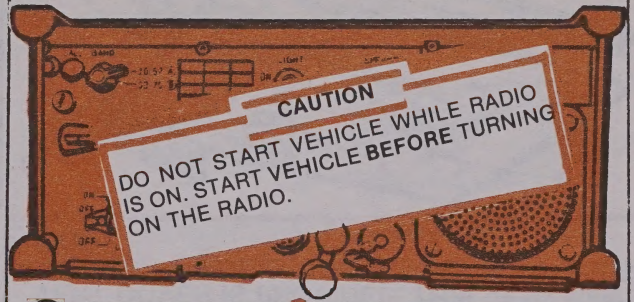
AND

after the R-T or AUX RECEIVER is installed, safety wire may be installed between the mount clamps (F).

R-T or AUX RECEIVER cannot be clamped in its mount securely.

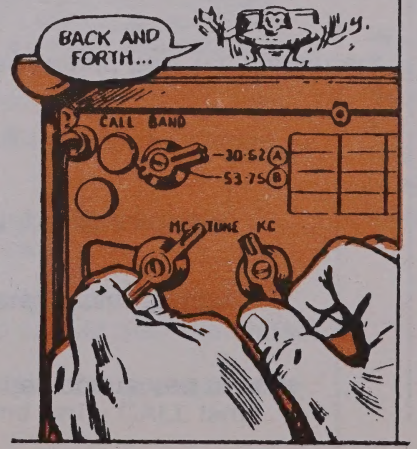
R-T or AUX RECEIVER MOUNTS are not securely mounted in the vehicle

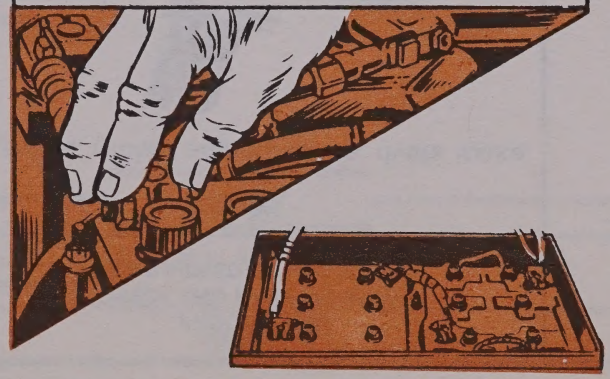
TABLE 2-1. PCMS (continued)

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED	PROCEDURES CHECK AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	FOR READINESS REPORTING EQUIPMENT IS NOT READY/AVAILABLE IF:
						R-T AND AUX RECEIVER		
✪ 19	✸					BASIC OPERATION (OVER A DISTANCE)	✪ BECAUSE RADIO RANGE IS AFFECTED BY TERRAIN, WEATHER, ANTENNA TYPES AND MANY OTHER CONDITIONS, THESE CHECKS SHOULD BE DONE OVER A DISTANCE AND UNDER CONDITIONS SELECTED BY YOUR COMMUNICATION'S SUPERVISOR. During normal operation: "KEY THE RADIO" and talk to the distant radio station. During transmission, you should hear: sidetone (your voice) and the blower running. During reception, you should hear the distant station. Set up the desired SQUELCH operation with the distant station, and verify CALL lamp operation.	When using the R-T: You cannot hear sidetone or the blower running, or the cover for the X-MODE receptacle is missing. When using the AUX RECEIVER: You cannot hear the distant station (if mission requires the AUX RECEIVER be available to monitor a specific frequency at all times).

| | | |

TABLE 2-1. PCMS (continued)

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED	PROCEDURES CHECK AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	FOR READINESS REPORTING EQUIPMENT IS NOT READY/AVAILABLE IF:
22	✸					R-T Operation with REMOTE CONTROL BOX (C-2742/-VRC) connected to PUSHBUTTON RT-246(-*)/VRC	With satisfactory pushbutton operation and REMOTE CONTROL BOX connected to the R-T: Check out each setting of the PWR SW on the REMOTE CONTROL BOX. Check out the CHAN SEL switch on the REMOTE CONTROL BOX for all 10 pushbutton channels. If REMOTE CONTROL BOXES are in TANDEM, check out each SW and CONTROL indicator to enable one box to get control from the other.	
23					✸	R-T and AUX RECEIVER Tuner Contacts	To prevent corrosion build-up on the tuner contacts, turn the tuner knobs back and forth several times. If you have an AUX receiver, do the same to its tuner knobs. 	

		VEHICLE BATTERY COMPART-MENT		
✪	24	✸	Cables and Terminals	Check to see that the: Battery terminals are not corroded. Radio power cable lugs are securely connected to the battery. Radio power cable leads are tagged. **Check with fingers—** **not** vise-grips or pliers. 

✪Your vehicle commander may direct that this step be done differently and/or at a different time.

TABLE 2-1. PCMS (continued)

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED	PROCEDURES CHECK AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	FOR READINESS REPORTING EQUIPMENT IS NOT READY/AVAILABLE IF:
						CVC Helmet		
25	✸					Outer Shell	Cracked, rubber edging, loose, rivets loose.	
26	✸					Clothing Clip		
	✸							
27	✸					Mike Boom Adjusting Knob	Missing, can't be tightened.	
28	✸					Bail-out Connector and Cord	Cord pinched, connectors separate smoothly.	
29	✸					Guide Boom	Bent, ball joint sticking or loose, frame or cord twisted.	

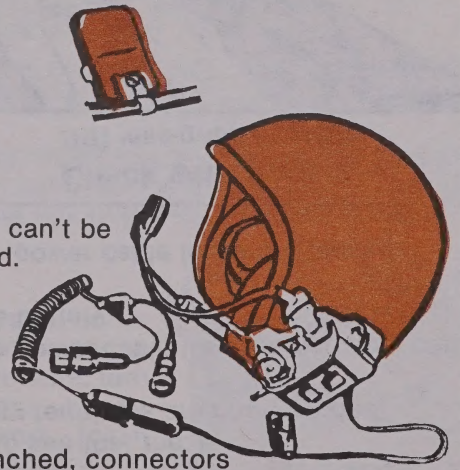


TABLE 2-1. PCMS (continued)

30	✸		Switch	Check operation.
31	✸		Sweatband	Missing, torn.
32	✸		Liner	Cloth torn. Foam or rubber parts hardened or missing.

CAUTION

BE CAREFUL NOT TO WET THE EARPHONE-MICROPHONE SET.

NOTE

Wash with warm water and suds and dry carefully.

TABLE 2-1. PCMS (continued)

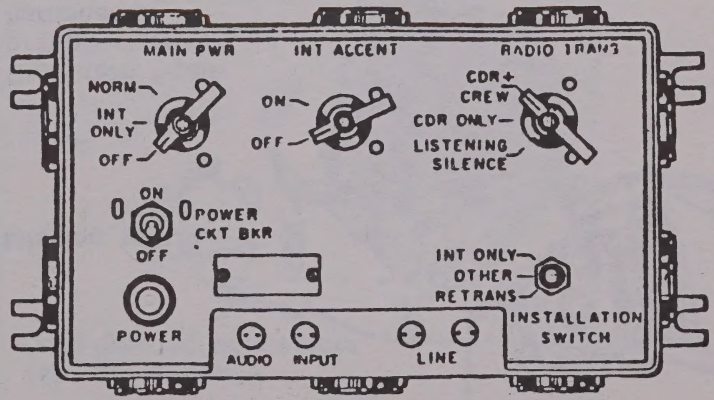
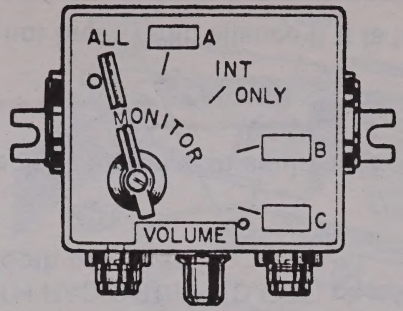
ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED	PROCEDURES CHECK AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	FOR READINESS REPORTING EQUIPMENT IS NOT READY/AVAILABLE IF:
						MAIN JUNCTION BOX-AMPLIFIER (all models)	**NOTE:** The procedures below that require you to check for proper operation of all controls and indicators include checking every mode of RADIO and INTERCOM operation possible with your authorized equipment and accessories. 	
33	✸					Operation	Check all controls and indicators for proper operation (including operation with an outside telephone and outside Control Box).	Intercom is not possible among crewmembers.

TABLE 2-1. PCMS (continued)

					COMMANDER'S AND CREW-MEMBER'S CONTROL BOX (C-2298/VRC AND C-10456 ( ) /VRC)			
34	✸				Operation	Check all controls for proper operation.	Intercom is not possible among crewmembers.
					DRIVER'S CONTROL BOX C-2297/VRC)			
35	✸				Operation	Check all controls and indicators for proper operation.	Intercom is not possible among crewmembers.



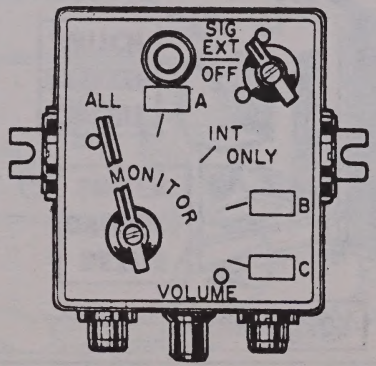


TABLE 2-1. PCMS (continued)

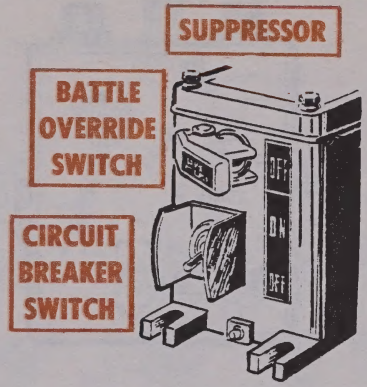
ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED	PROCEDURES CHECK AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	FOR READINESS REPORTING EQUIPMENT IS NOT READY/AVAILABLE IF:
						SUPPRESSOR, ELECTRICAL TRANSIENT (MX-7778/GRC)		
36	✸					Circuit Breaker	Check for smooth operation.	CIRCUIT BREAKER does not operate properly or power is not supplied to the equipment when the circuitbreaker in ON.
37	✸					BATTLE OVERRIDE switch	WITH RADIO TURNED OFF, check for smooth operation.	
38	✸					Normal Operation	Check operation with equipment operating. **CAUTION:** Do not break radio silence if it is in effect.	SUPPRESSOR operates in an unsatisfactory manner (prevents communications).

TABLE 2-1. PCMS (continued)

| | | |

TABLE 2-1. PCMS (continued)

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED	PROCEDURES CHECK AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	FOR READINESS REPORTING EQUIPMENT IS NOT READY/AVAILABLE IF:
						CRITICAL SUPPORT BY C-E ORG MAINT		
42					✸	URGENT MWO	You must check with C-E ORG MAINT once a MONTH TO MAKE SURE THAT ALL URGENT MODIFICATION WORK ORDERS (MWO'S) have been done to all of your radio and intercom equipment.	C-E ORG MAINT TELLS YOU THAT ONE OR MORE URGENT MWO'S HAVE NOT BEEN DONE TO YOUR EQUIPMENT.
★ 43						Links in R-T MOUNTS and AUX RECEIVER MOUNTS	Whenever C-E ORG MAINT works on or replaces any R-T MOUNT or AUX RECEIVER MOUNT, check with them to make sure the links inside the mount are properly connected.	
★ 44						Internal X-MODE Switches	Whenever C-E ORG MAINT replaces any R-T or AUX RECEIVER, check with them to make sure the internal X-MODE switch in each radio is set to the proper position.	
★ 45						R-T Cooling	After you have operated your R-T in a dusty area, ask C-E ORG MAINT to check and clean if necessary, the vanes and squirrel cage fins of your R-T's blower. They are located inside the R-T.	

★ The interval for these items varies and they should be done as stated in the PROCEDURES column.

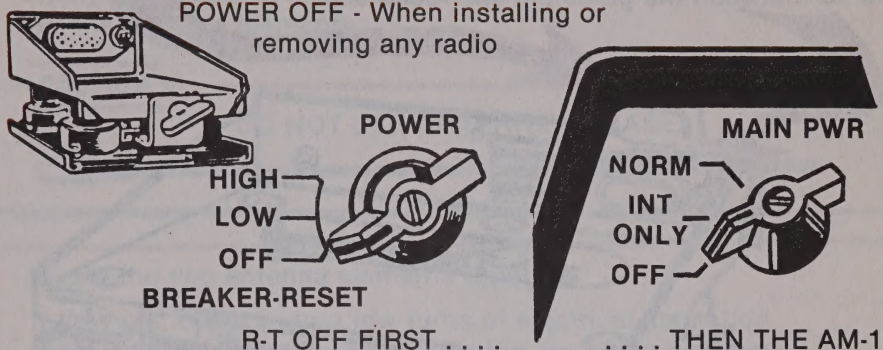
SECTION III

INSTALLATION, ASSEMBLY AND DISASSEMBLY OF MAJOR ITEMS

2-53. GENERAL

CAUTION

POWER OFF - When installing or removing any radio



WARNING

THE RECEIVER-TRANSMITTERS ARE COMPACT AND HEAVY (OVER 50 POUNDS). BE CAREFUL WHEN HANDLING THEM IN ORDER TO PROTECT PERSONNEL FROM SERIOUS INJURY AND THE EQUIPMENT FROM DAMAGE. USE TWO PERSONS TO CARRY THE R-T.

CAUTION

When pulling any R-T from an R-T MOUNT, carefully grasp both guards (or handles) to pull the unit from the radio mount (straight out) and continue to use both hands to lift and carry the unit. NEVER CARRY OR LIFT THE RECEIVER-TRANSMITTER BY ONLY ONE OF THE GUARDS (OR HANDLES).

CAUTION

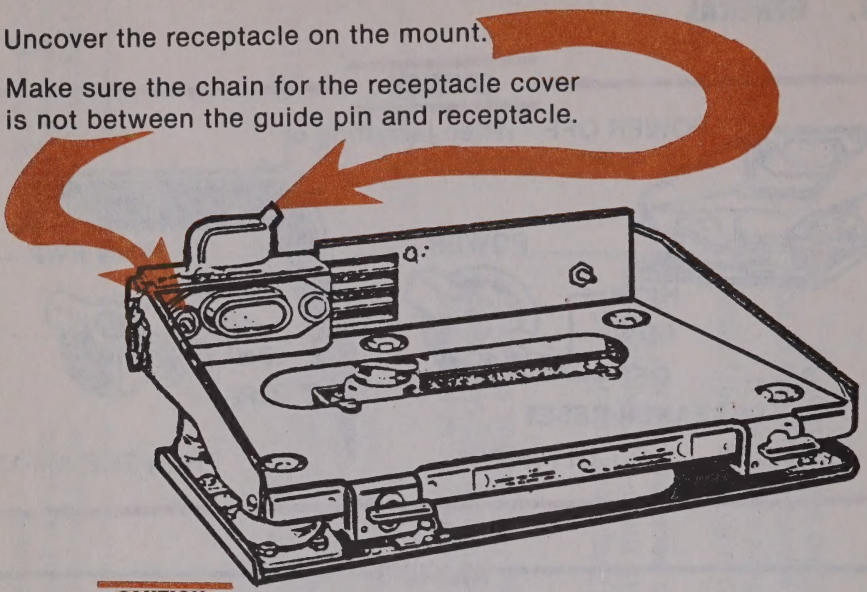
Do not lay the R-T on its back. This may damage the blower assembly. Lay it on one side.

2-54. R-T AND AUX RECEIVER INSTALLATION

A Before placing the radio on the mount, clean the mount.

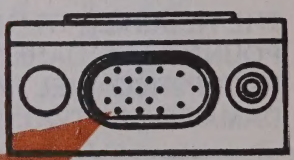
B Uncover the receptacle on the mount.

C Make sure the chain for the receptacle cover is not between the guide pin and receptacle.



CAUTION:

DOUBLE CHECK THE CABLE CONNECTIONS C-E ORG MAINT MADE TO THE RECEPTACLES ON THE MOUNT.



D Make sure the pins on the back of the radio are straight.

E Lift the radio onto the mount and carefully push it straight back to seat the radio pins into the mount receptacle.

F Tighten the mount clamp(s) to lock the radio on the mount. Install safety wire to keep clamps from loosening.

G Connect cable assemblies to the radio and mount as shown on the cabling diagram (see Section IV CABLING).

2-55. REMOVING R-T AND AUX RECEIVER

A Disconnect all cables connected to the radio's front panel.

B Remove safety wire and loosen clamps.

C Carefully remove radio from its mount (pull it straight out).

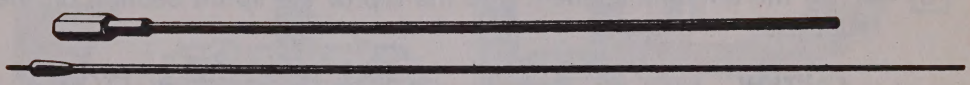
D Cover or cap all receptacles.

2-56. INSTALLATION OF ANTENNA ELEMENTS ON ROUND BASE ANTENNA (AS-1729/VRC) OR BOX BASE ANTENNA (AT-912/VRC)

A Apply a light coat of Silicone Compound (item 2, appx. D) to the threads on the antenna elements.

CAUTION

DO NOT USE GRAPHITE GREASE.



B Screw the two antenna elements together.

If they are loose, wrap a few turns of electrical insulation tape around the joint (after putting the elements together).

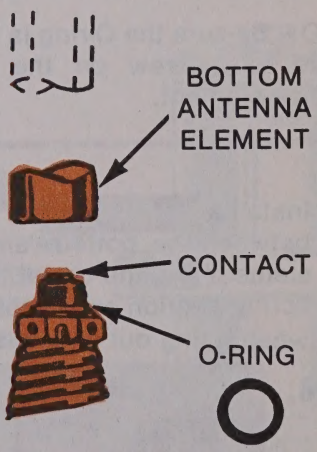
C Screw the bottom section onto the top of the spring section of the mount.

CAUTION

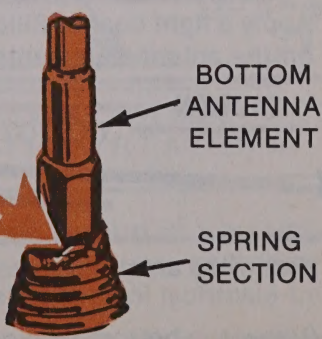
Be sure that the contact on the top of the spring section is not loose and that it sticks out from the top of the spring section.

IF YOU HAVE ANY PROBLEMS WITH THE CONTACT, NOTIFY C-E ORG MAINT.

ALSO--Be sure the O-ring is in place before you screw on the bottom antenna element.



D Install a safety wire between the bottom antenna element and the top of the spring section on the mount, when going out on a mission.

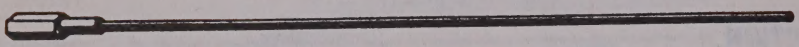


2-57. INSTALLATION OF ANTENNA ELEMENT ON COMPACT ANTENNA (AS-2731/GRC)

A Apply a light coat of Silicone Compound (item 2, appx. D) to the threads on the antenna elements.

CAUTION

DO NOT USE GRAPHITE GREASE.



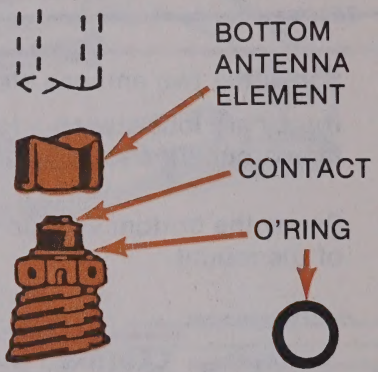
B Screw the antenna element into the top of the sprint section on the mount.

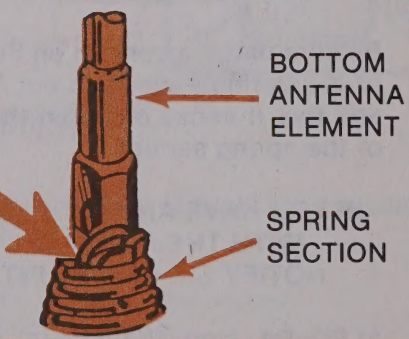
CAUTION

Be sure that the contact on the top of the spring section is not loose and that it sticks out from the top of the spring section.

IF YOU HAVE ANY PROBLEMS WITH THE CONTACT, NOTIFY C-E ORG MAINT.

ALSO -- Be sure the O-ring is in place before you screw on the bottom antenna element.





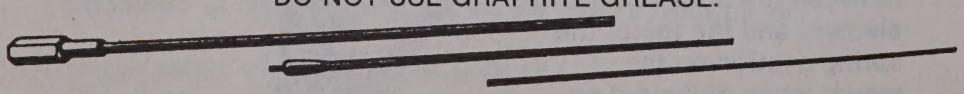
C Install a safety wire between the bottom antenna element and the top of the spring section on the mount when going out on a mission.

2-58. INSTALLATION OF ANTENNA ELEMENTS ON AUX RECEIVER ANTENNA MAST BASE (AB-558/GR)

A Apply a light coat of Silicone Compound (item 2, appx. D) to the threads on the antenna elements.

CAUTION

DO NOT USE GRAPHITE GREASE.

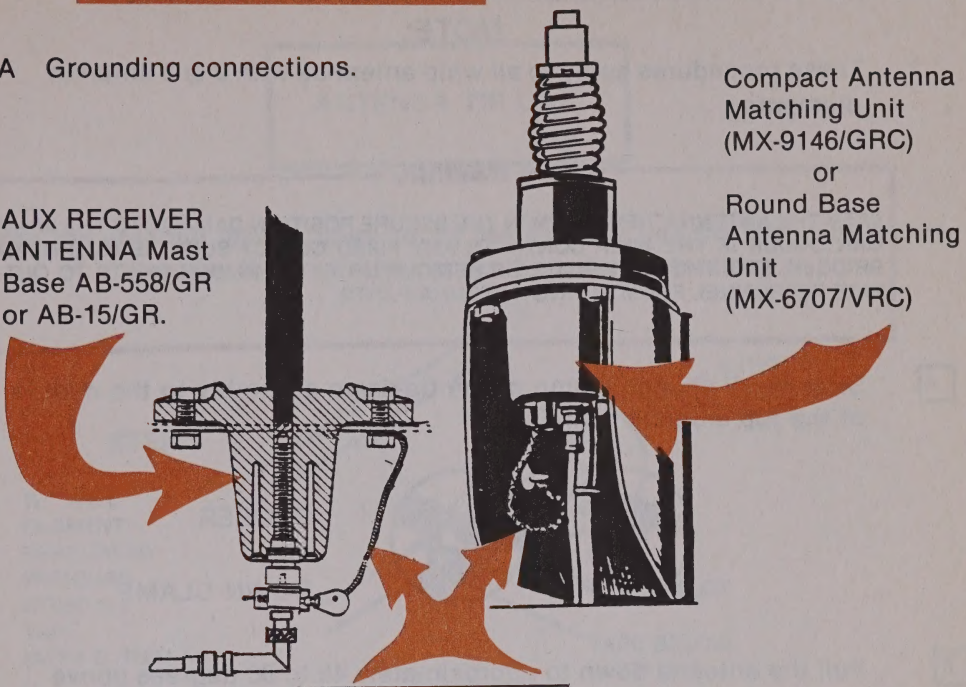


B Screw the antenna elements together. If they are loose, wrap a few turns of electrical insulation tape around the joint.

C Screw the bottom section into the top of the spring section.

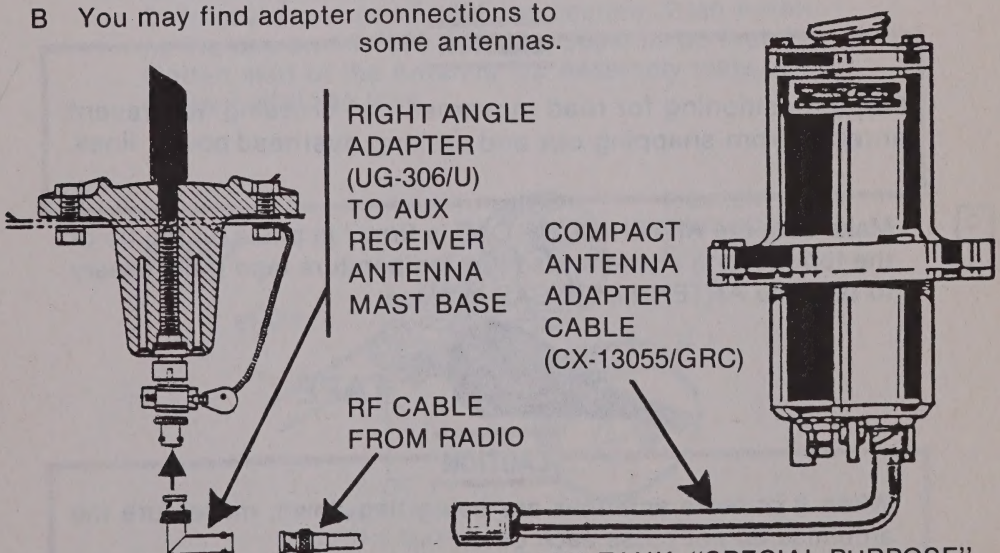
2-59. ANTENNA CONNECTIONS

A Grounding connections.


AUX RECEIVER ANTENNA Mast Base AB-558/GR or AB-15/GR.
Compact Antenna Matching Unit (MX-9146/GRC)
or
Round Base Antenna Matching Unit (MX-6707/VRC)

Make sure the ground connection for your antenna is securely connected. Report problems to C-E ORG MAINT.

B You may find adapter connections to some antennas.


RIGHT ANGLE ADAPTER (UG-306/U) TO AUX RECEIVER ANTENNA MAST BASE
COMPACT ANTENNA ADAPTER CABLE (CX-13055/GRC)
RF CABLE FROM RADIO

C Remember, in some models of the M60 TANK, "SPECIAL PURPOSE" cables MUST be used to connect the R-T to the R-T ANTENNA MATCHING UNIT.

WARNING

SERIOUS INJURY OR EVEN DEATH CAN OCCUR IF YOU USE REGULAR CABLES IN PLACE OF THE SPECIAL PURPOSE CABLES.

2-60. WHIP ANTENNA TIE-DOWN PROCEDURES

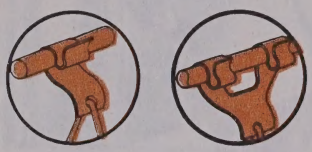
NOTE:

These procedures apply to all whip antennas with 2 or 3 antenna elements.

WARNING

WITH THE ANTENNA TIED DOWN IN THE SECURE POSITION DAMAGE TO THE WHIP CAN OCCUR IF THE WHIP CONTACTS ANY FIXED OBJECT SUCH AS OVERHEAD BRIDGES, ETC. THE POSSIBILITY OF SERIOUS OR FATAL INJURY EXISTS TO OUTSIDE PERSONNEL FROM FLYING ANTENNA PARTS.

A Slide the V-shaped clamp of the tie-down assembly to the middle of the top antenna element.



PROPER TIE-DOWN CLAMP

B Pull the antenna down to approximately 45 to 60 degrees above the ground level and tie the tie-down rope(s) to the approved place.

CAUTION

Proper positioning for road movement/rail crossing to prevent antenna from snapping out and striking overhead power lines.

C Make sure the ANTENNA TIP CAP is firmly in place on the tip of the top antenna element. Use low temperature tape if necessary to tape the ANTENNA TIP CAP in place.

CAUTION

When 2 or more antennas are being tied down, make sure the antennas do not cross each other.

Double check your antennas after tie-down to make sure they do not stick out beyond the sides of the vehicle and that no person walking by the vehicle can be hit in the face by the tied-down antenna tip.

D Remember, radio range is decreased when you are operating with your antenna tied down.

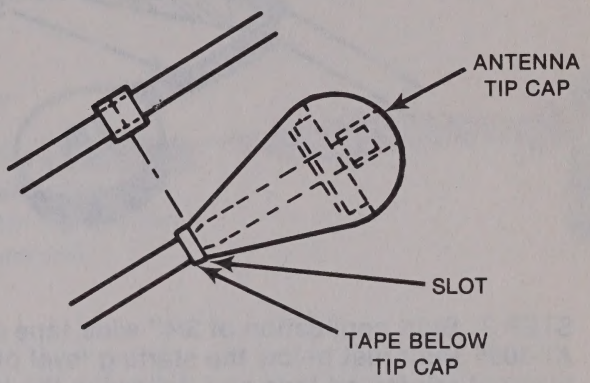
2-60.1 INSTALLING AS-1729/VRC ANTENNA

ANTENNA TIP CAP

When the antenna tip cap does not fit the AT-1095, use the following procedures to attach the cap to the antenna section.

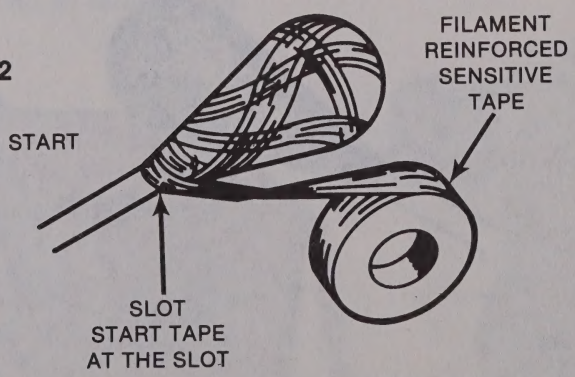
STEP 1

½'' WIDE FILAMENT REINFORCED PRESSURE SENSITIVE TAPE (APPX C. ITEM 4)



STEP 1. Apply 6-7 layers of 1/2'' wide filament-reinforced pressure sensitive tape approximately 2'' from the end of AT-1095 top section. Push Antenna Tip cap on AT-1095 as far as possible so that the slotted skirt of the Antenna Tip Assembly rests in contact with the tape.

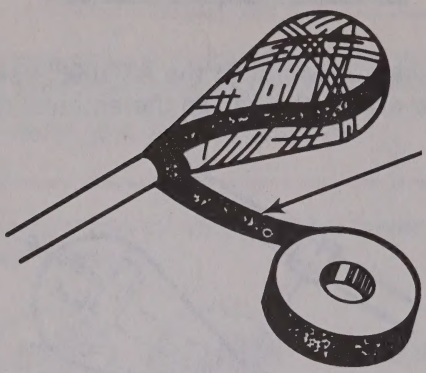
STEP 2



STEP 2. Start tape at the slot. Wrap across skirt slot to conform with the shape of the tip cap base so that the tape goes over the cap top and returns to the slotted end. Cut tape and make new start at next slot, repeating the procedure in a crossing pattern until all slots have been reinforced and the antenna tip cap is completely covered.

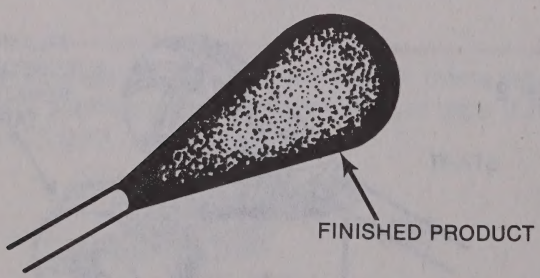
2-60.1 INSTALLING AS-1729/VRC ANTENNA - Continued

STEP 3



STEP 3. Start application of 3/4" wide tape on the AT-1095 shaft just below the starting level of the filament reinforced tape and, following the tip contour while lightly stretching the electrical tape, wrap over the top and back to the starting position. Repeat until entire tip assemby is completely covered and the joint below the cap is neatly tapered to the shaft of the AT-1095.

STEP 4



STEP 4. The filament reinforced tape acts to secure the two shells of the tip assembly together, to reinforce the plastic slotted skirt, to cushion against impact, and to secure the tip assembly to the AT-1095. The electrical insulating tape seals and protects the filament reinforced tape from the effects of sunlight and moisture. Replace tape when ex cessively scuffed or weathered.

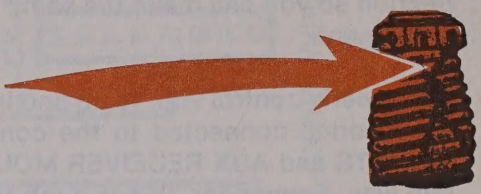
2-61. DISASSEMBLY OF ALL WHIP ANTENNAS

A Remove the tie-down assembly (if used).

B Remove the safety wire (if used) from the bottom antenna element.

BUT

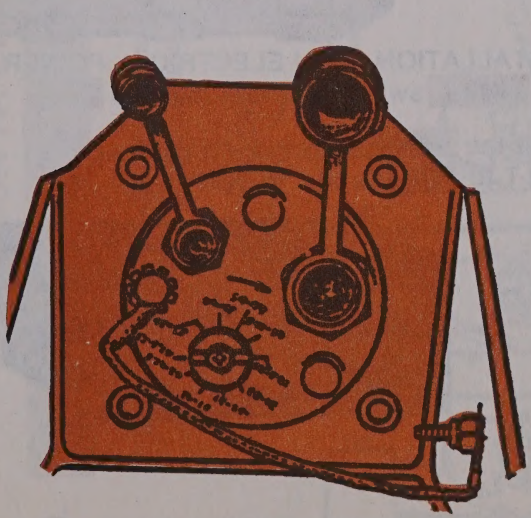
Leave the safety wire attached to the top of the spring section for future use.

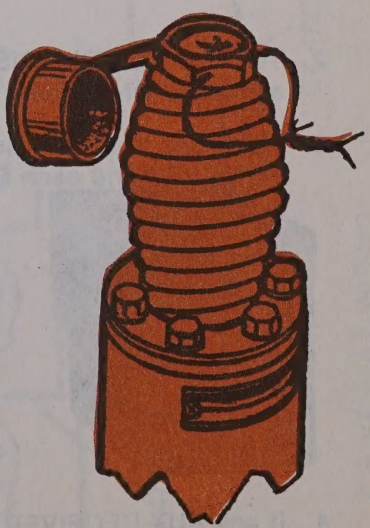


C Unscrew the antenna element(s).

D Store the removed antenna element(s) and tie-down(s).

E Cover or cap all receptacles.





2-62. INSTALLATION OF MAIN JUNCTION BOX-AMPLIFIER AND CONTROL BOXES

A These items are normally permanently installed in the proper location. If it is necessary to connect cables, carefully follow the cabling drawings in SECTION IV, CABLING.

B When installing cables, make sure that all nuts, bolts, screws and lock washers holding the equipment and cables in place are not loose or missing. Report any problems to C-E ORG MAINT.

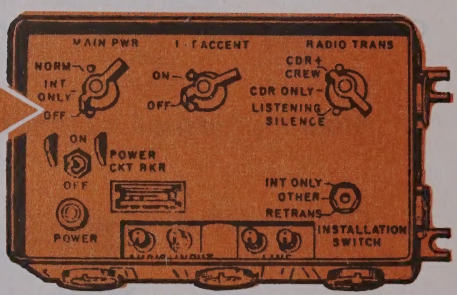
C When removing cables, carefully note their position and angle of connection so you can make the same connection when you re-cable the equipment.

D To properly control your radio and intercom equipment with the audio accessories connected to the control boxes, the "links" in all R-T MOUNTS and AUX RECEIVER MOUNTS must be connected in a certain way. Remember, this is a job for C-E ORG MAINT.

BUT

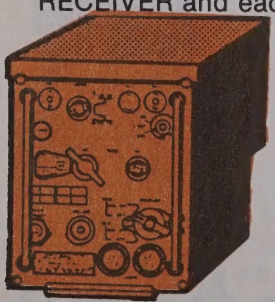
If C-E ORG MAINT is not handy to check your link settings, YOU can do a simple tests as follows:

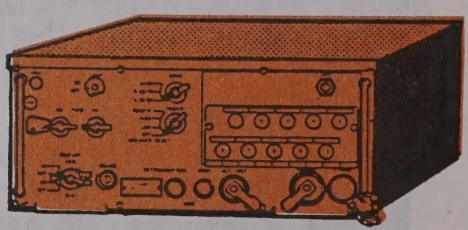
1 Turn the MAIN PWR switch on the MAIN JUNCTION BOX-AMPLIFIER to **OFF**.



2 Turn the VEHICLE/INSTALLATION MAIN ELECTRICAL POWER switch to ON and the **LIGHT** switch on every radio to **ON**.

3 Next, one at a time, set the **POWER** switch on each AUX RECEIVER and each R-T to **ON** (do the "A" R-T last).

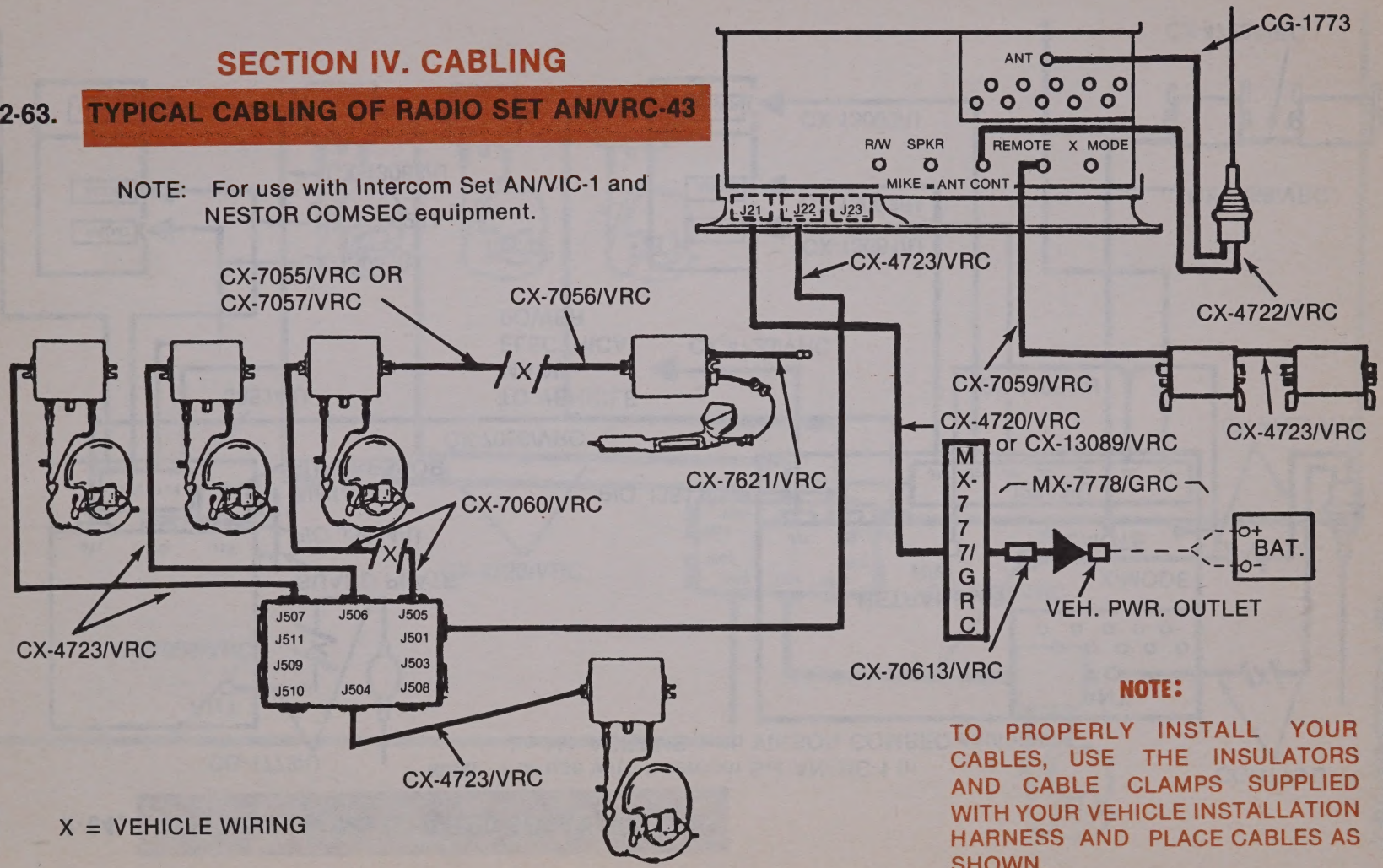




4 If any AUX RECEIVER or any R-T comes ON (dial light lights up), your links are set wrong. NOTIFY YOUR SUPERVISOR.

2-63. TYPICAL CABLING OF RADIO SET AN/VRC-43

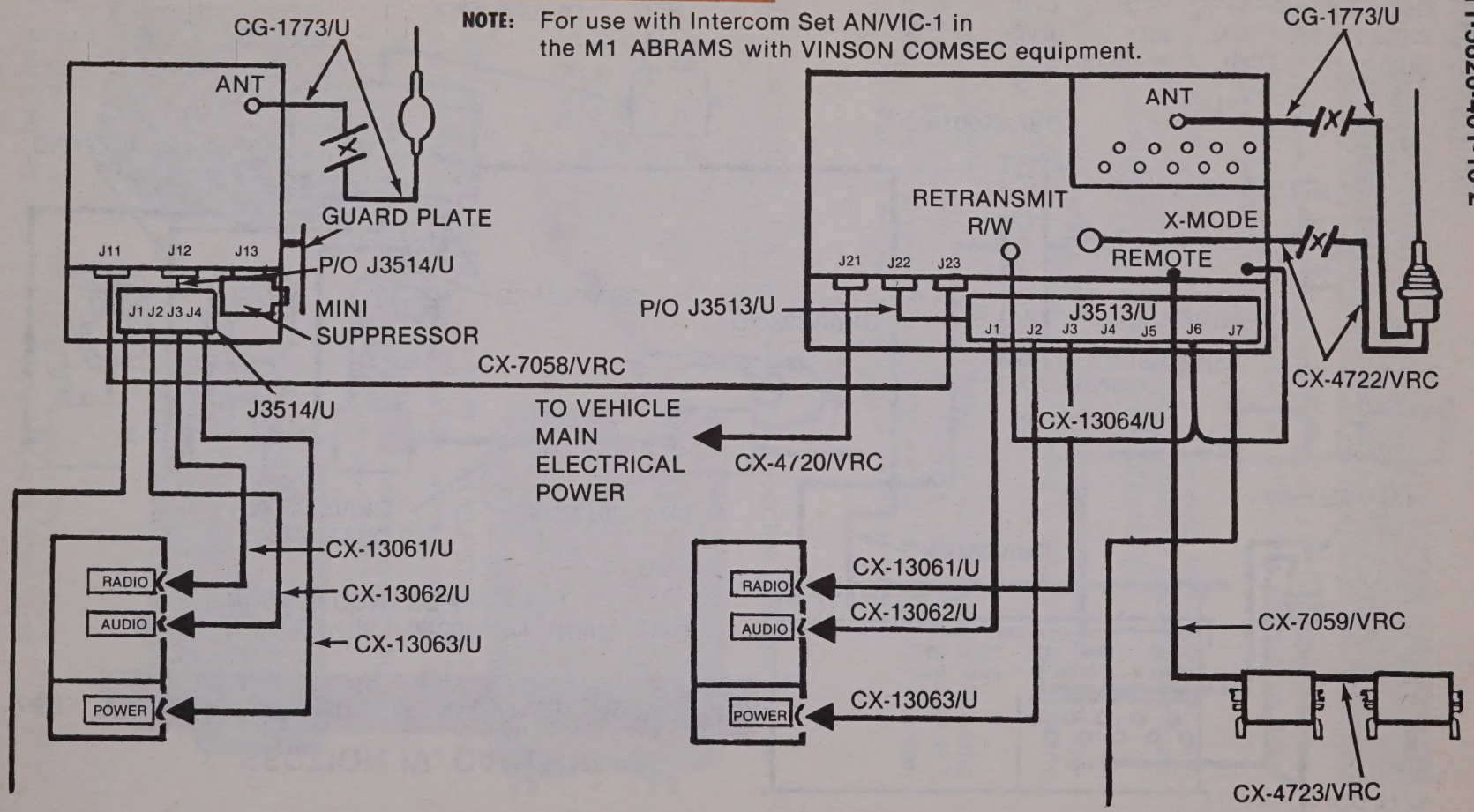
NOTE: For use with Intercom Set AN/VIC-1 and NESTOR COMSEC equipment.



NOTE:

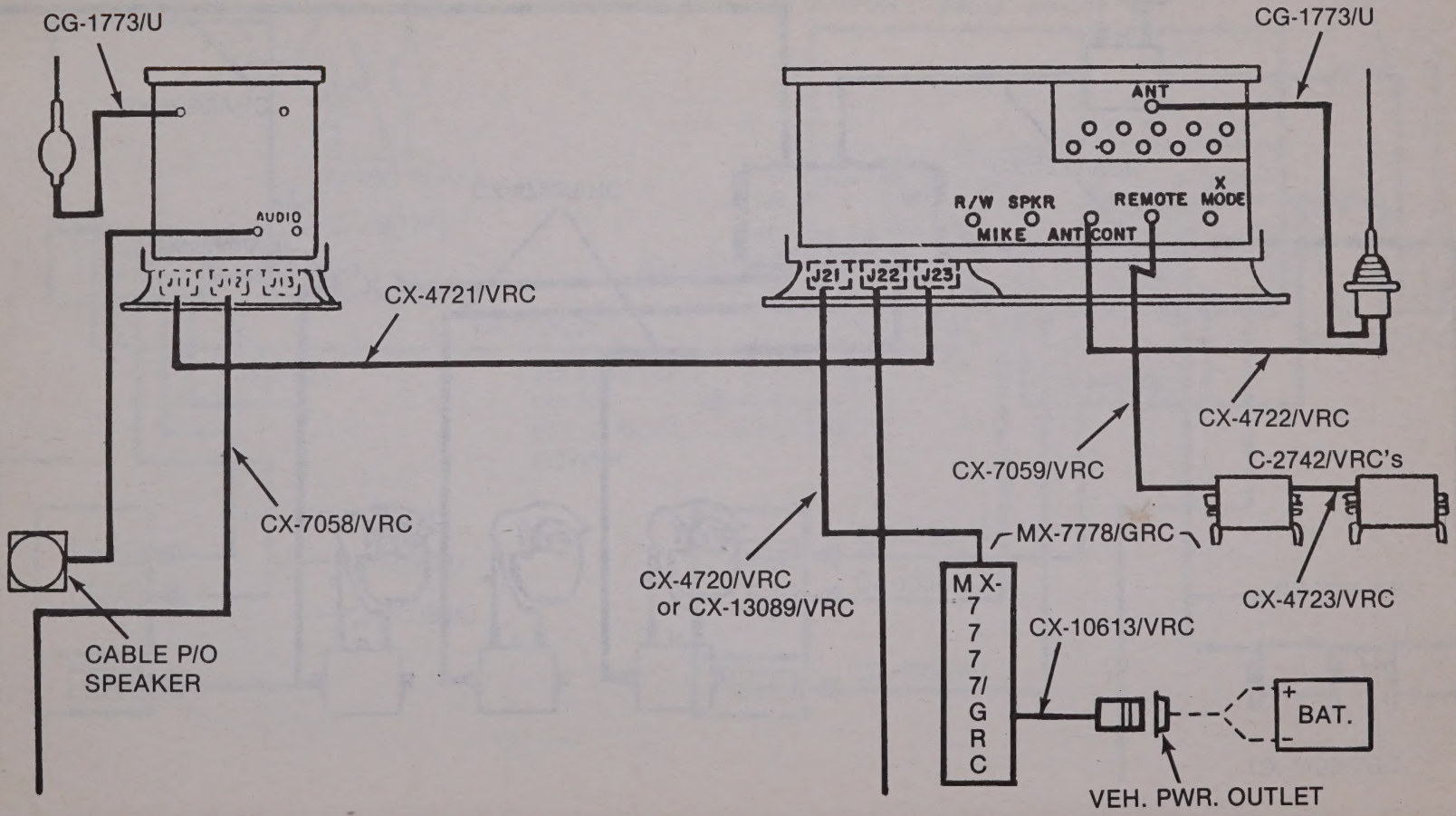
TO PROPERLY INSTALL YOUR CABLES, USE THE INSULATORS AND CABLE CLAMPS SUPPLIED WITH YOUR VEHICLE INSTALLATION HARNESS AND PLACE CABLES AS SHOWN.

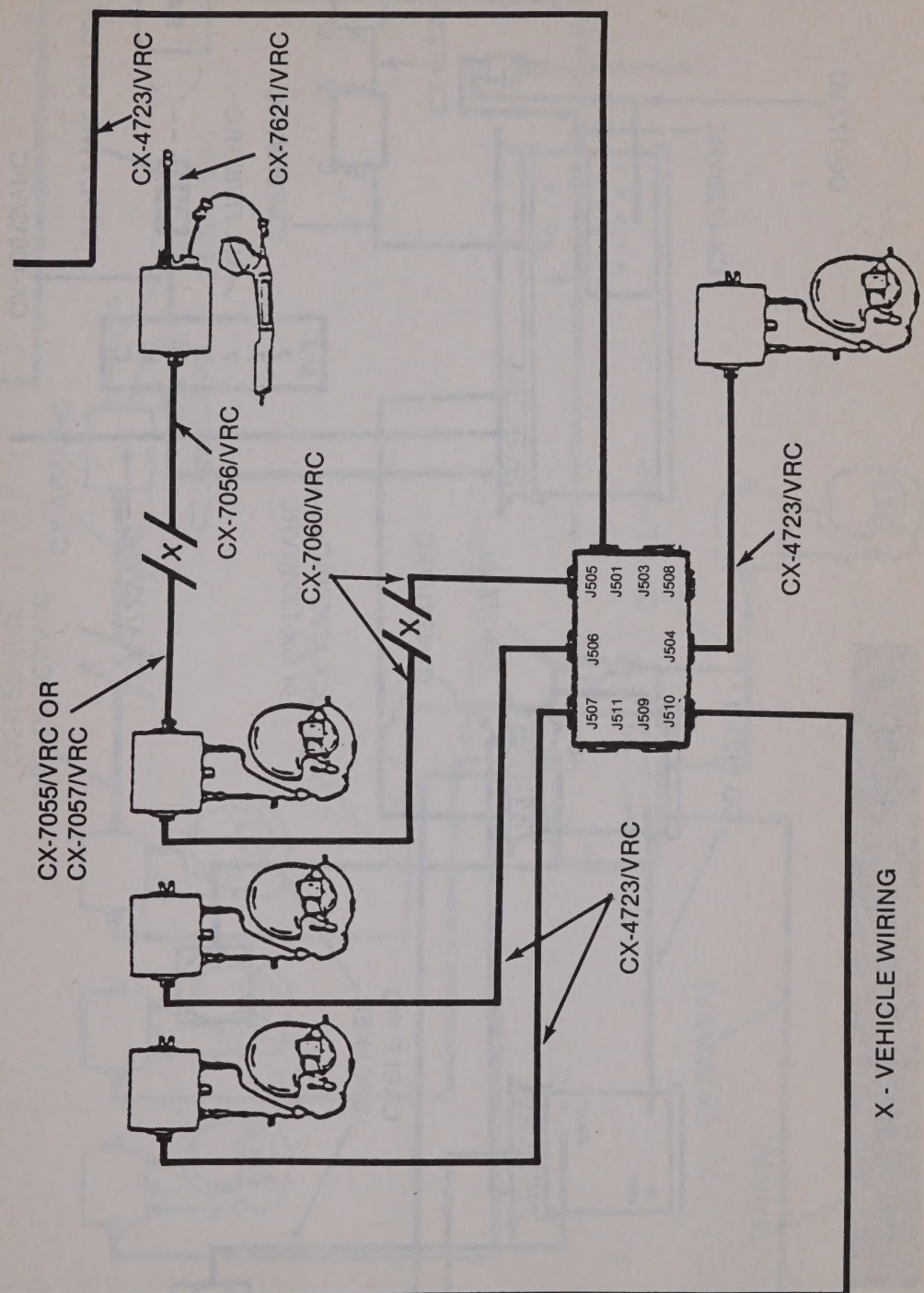
2-64. TYPICAL CABLING OF RADIO SET AN/VRC-12



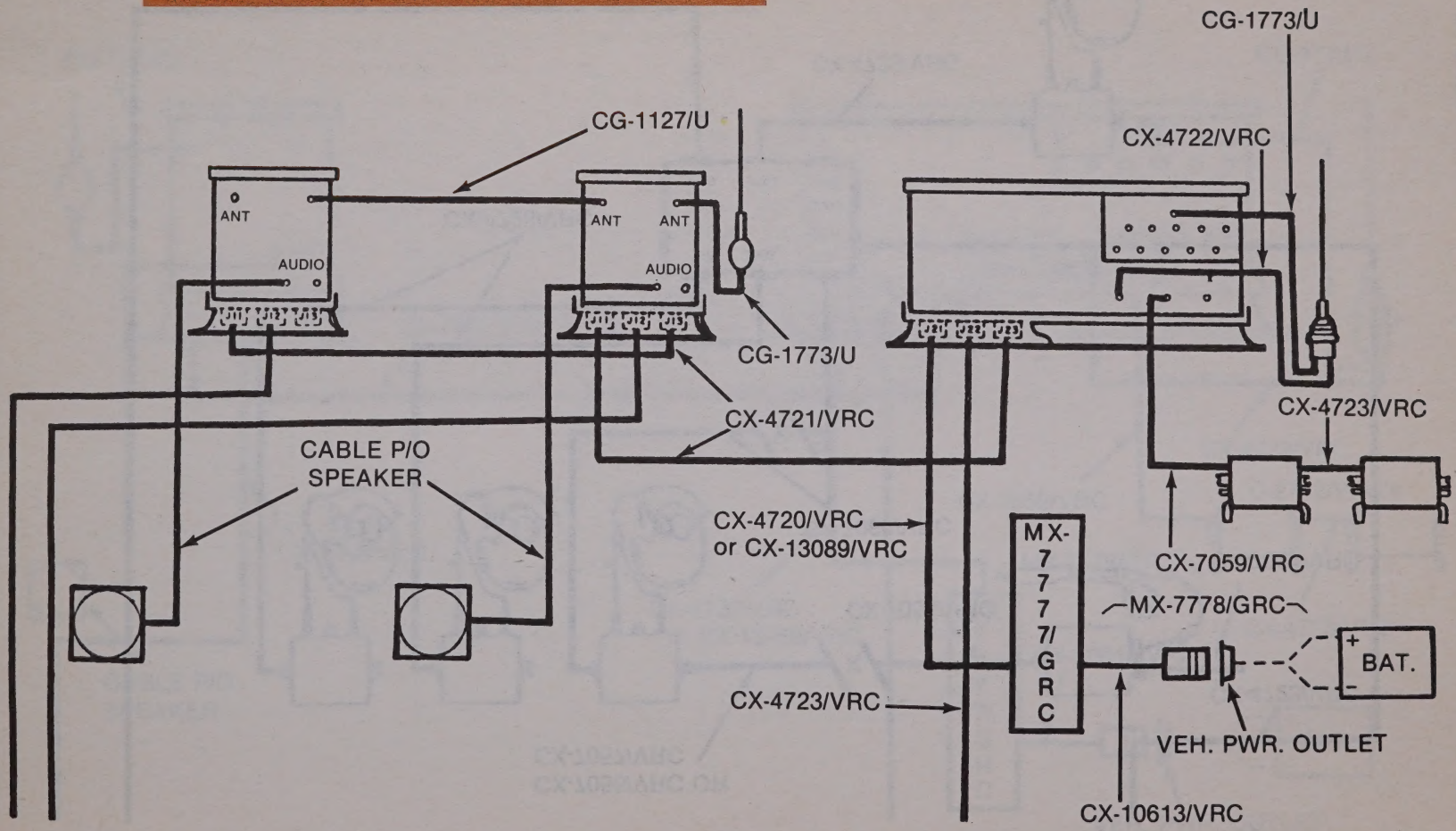
J501
J503
J505
J508
J506
J504
J507
J510
J511
J509
CX-4723/VRC
CX-4723/VRC
CX-7060/VRC
CX-7058/VRC
X
X = VEHICLE WIRING

2.65. TYPICAL CABLING OF RADIO SET AN/VRC-12



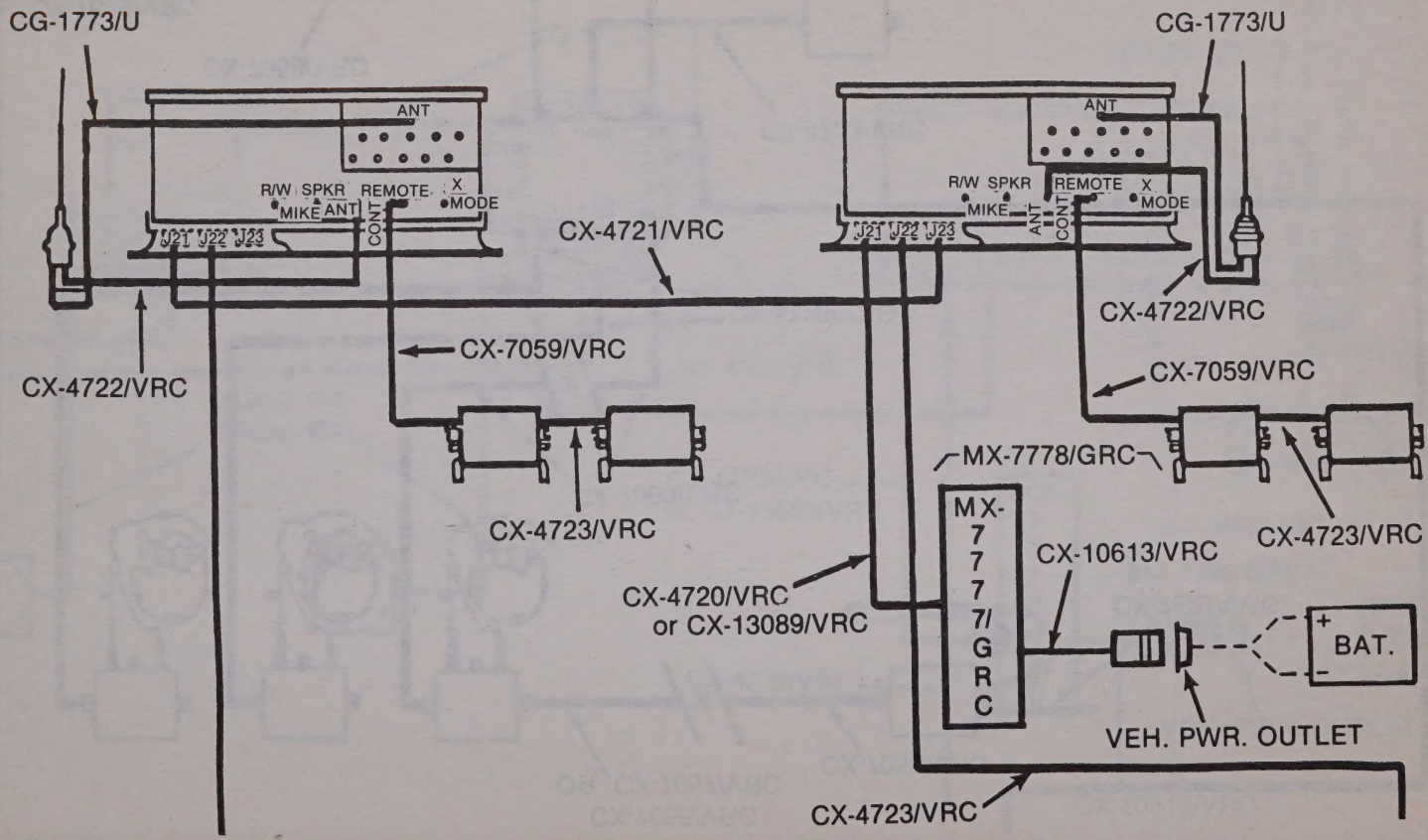

CX-4723/VRC
CX-7621/VRC
CX-7056/VRC
CX-7060/VRC
CX-7055/VRC OR
CX-7057/VRC
CX-4723/VRC
CX-4723/VRC
J505
J501
J503
J508
J506
J504
J507
J511
J509
J510
X - VEHICLE WIRING

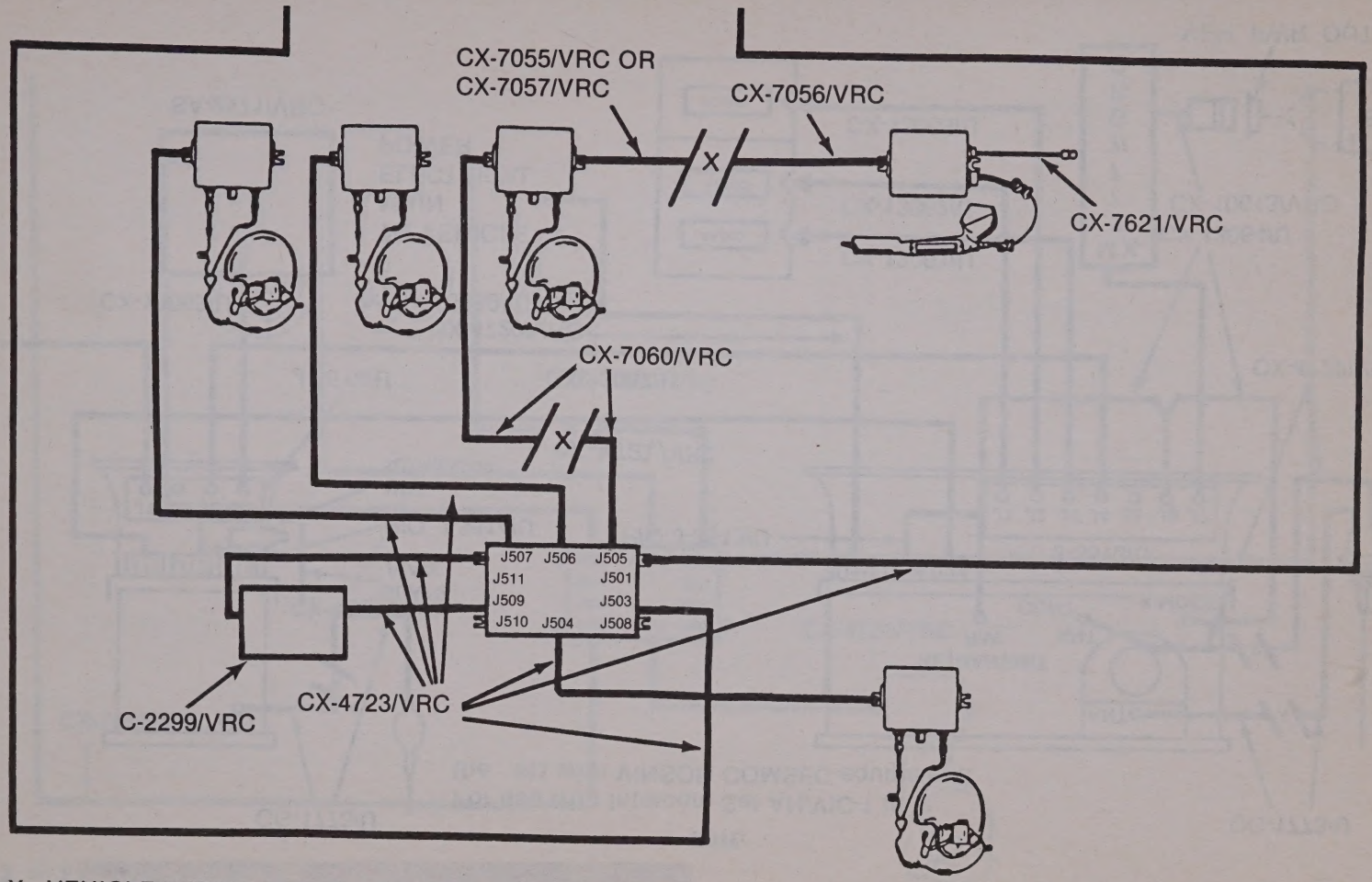
2-66. TYPICAL CABLING OF RADIO SET AN/VRC-44



CX-7621/VRC
CX-7056/VRC
CX-7055/VRC
OR CX-7057/VRC
X
CX-7060/VRC
X
CX-4723/VRC
CX-4723/VRC
J501
J503
J505
J506
J508
J504
J507
J511
J509
J510
CX-7058/VRC
CX-7616/VRC
X = VEHICLE WIRING

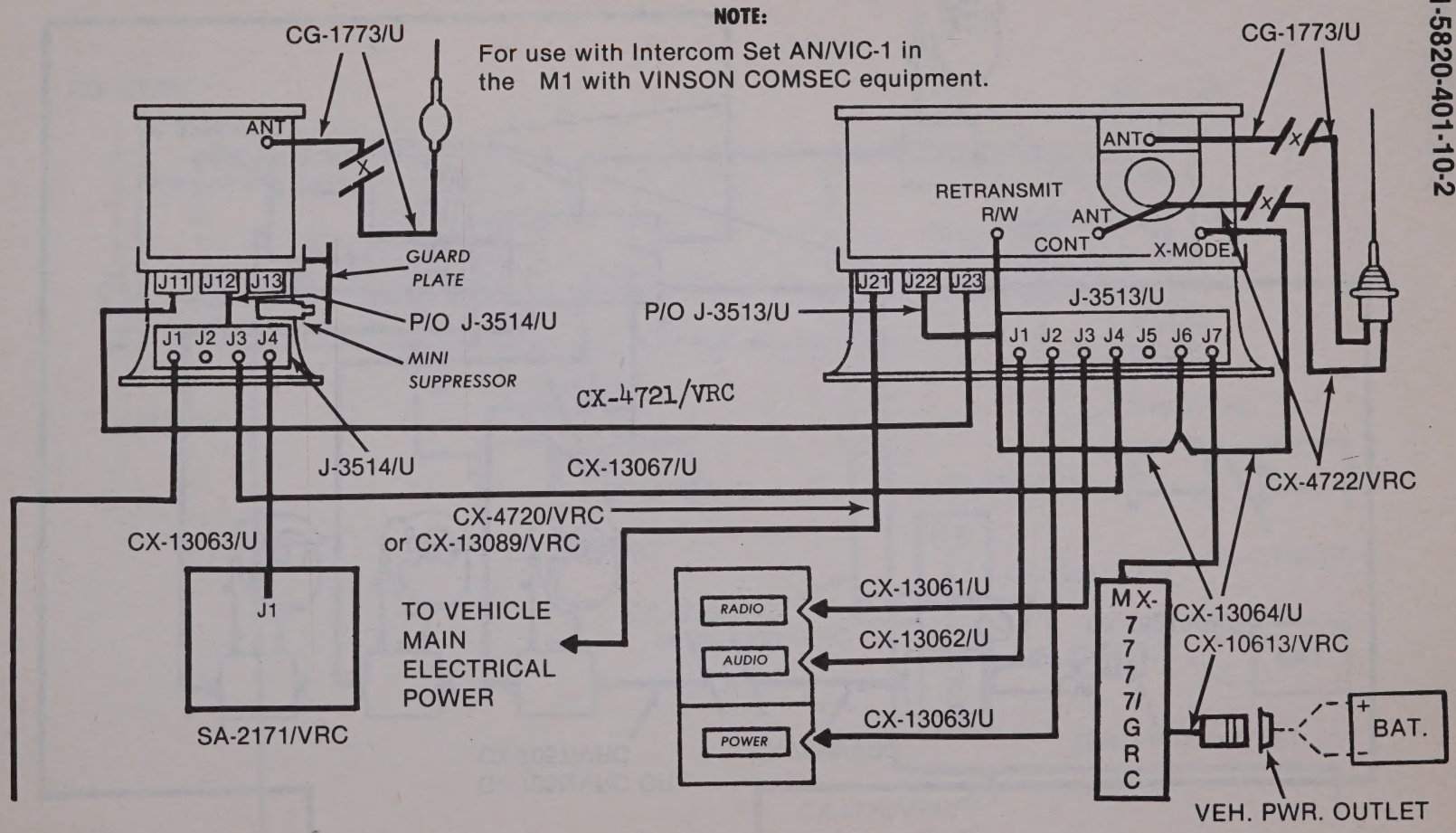
2-67. TYPICAL CABLING OF RADIO SET AN/VRC-45





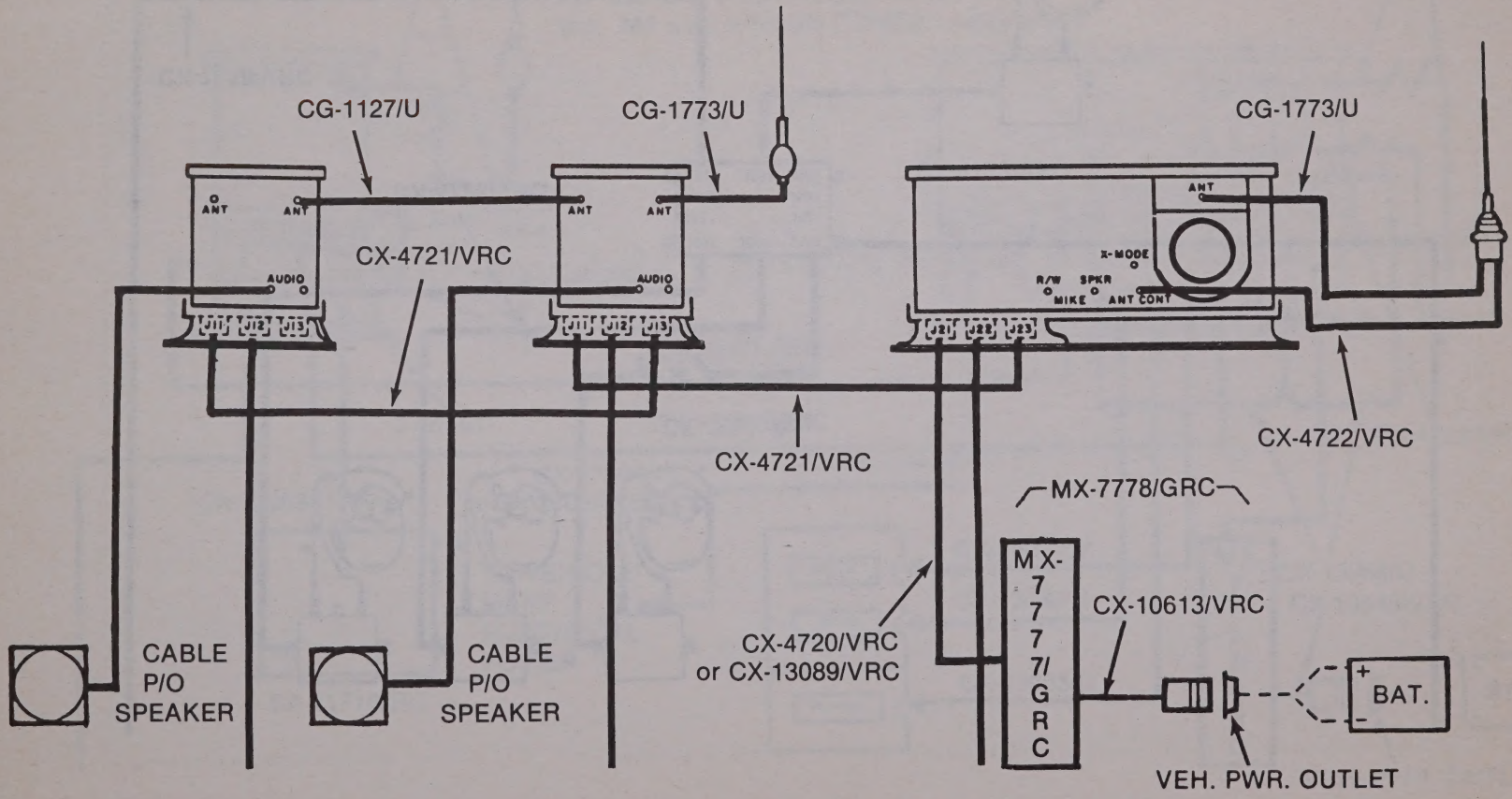
X - VEHICLE WIRING

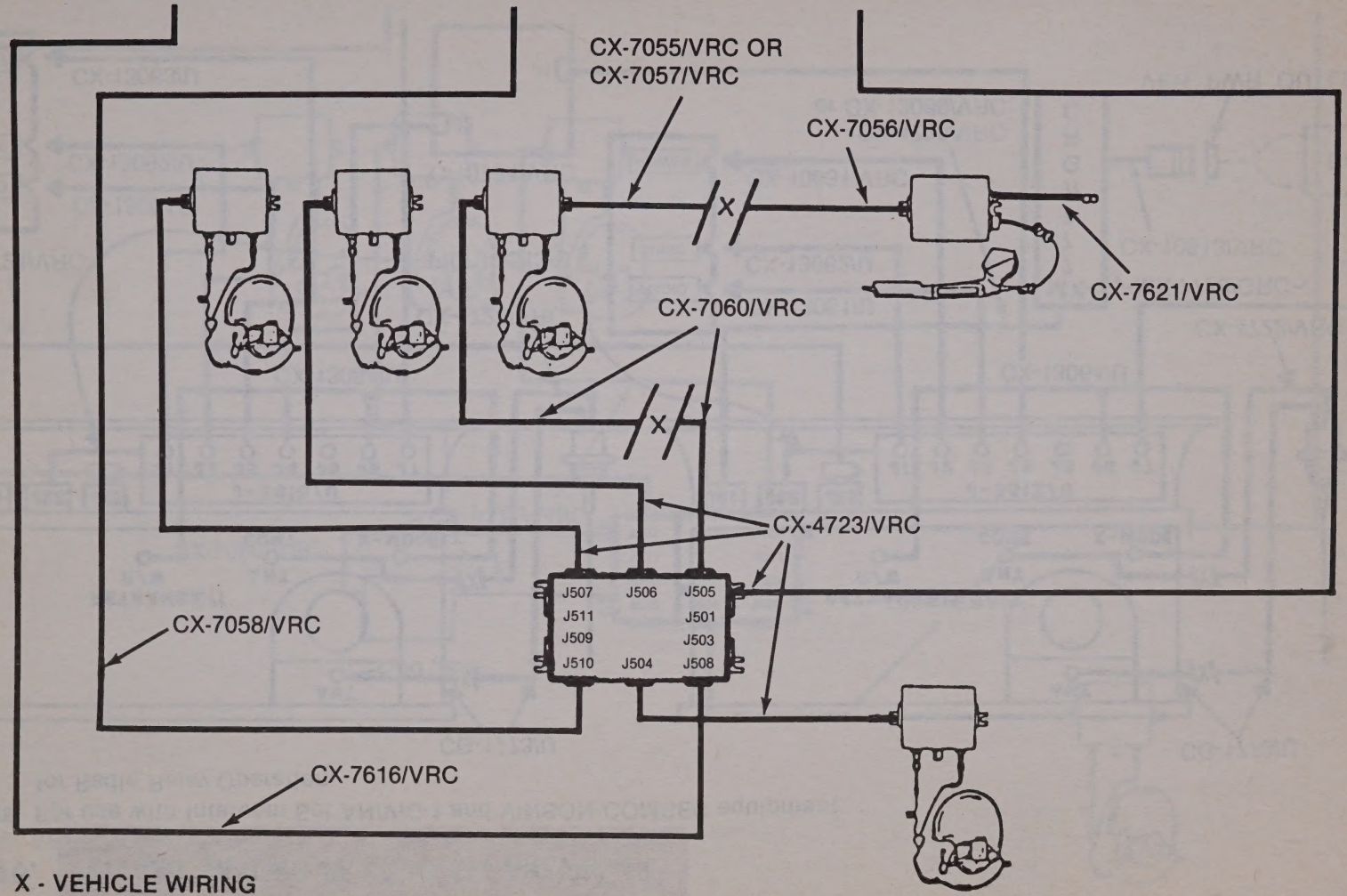
2-68. TYPICAL CABLING OF RADIO SET AN/VRC-47



CX-7060/VRC
X
CX-4723/VRC
CX-4723/VRC
CX-7058/VRC
J505
J501
J503
J508
J504
J510
J509
J511
J506
J507
X = VEHICLE WIRING

2-69. TYPICAL CABLING OF RADIO SET AN/VRC-48

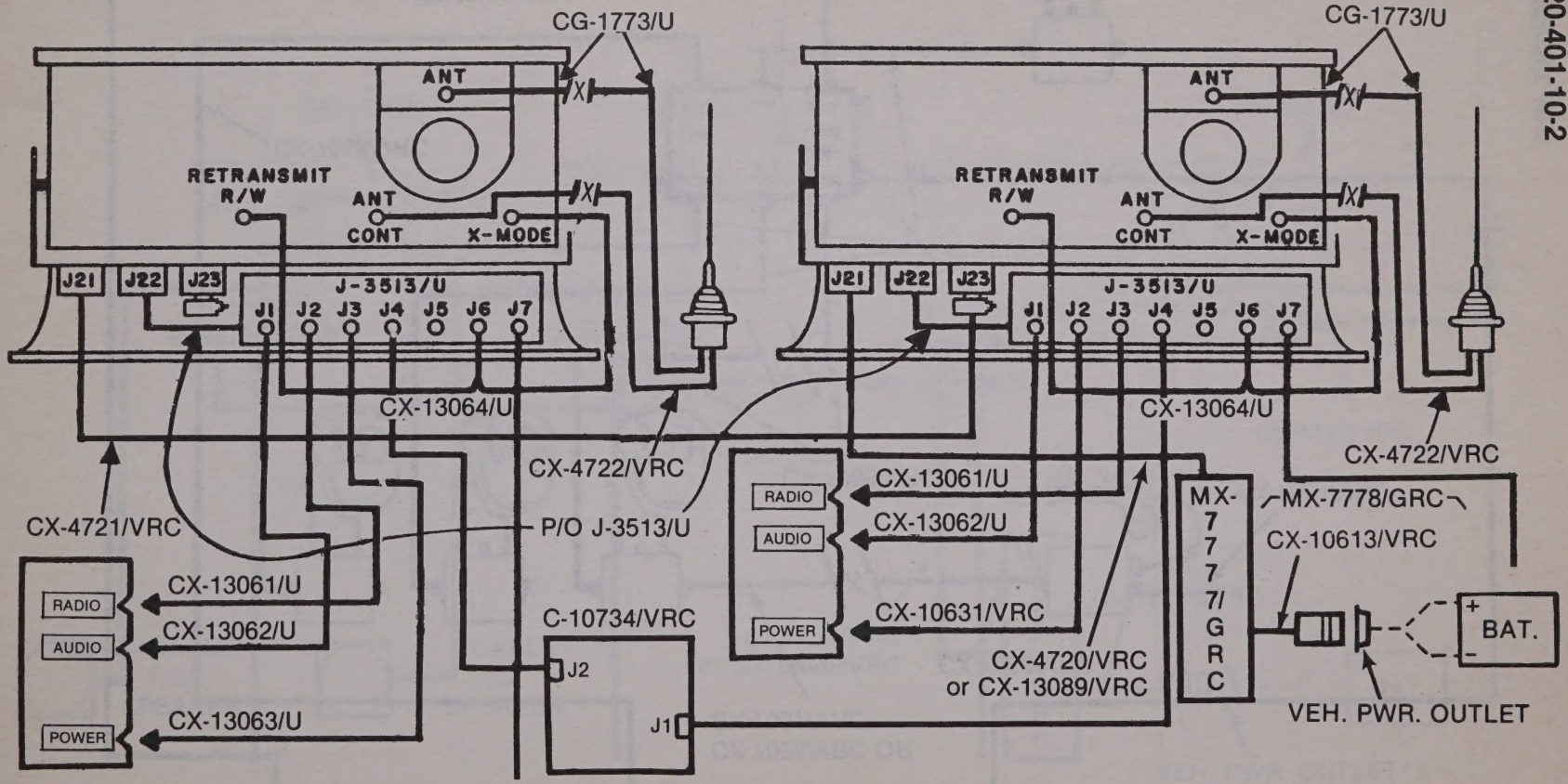




X - VEHICLE WIRING

2-70. TYPICAL CABLING OF RADIO SET AN/VRC-49

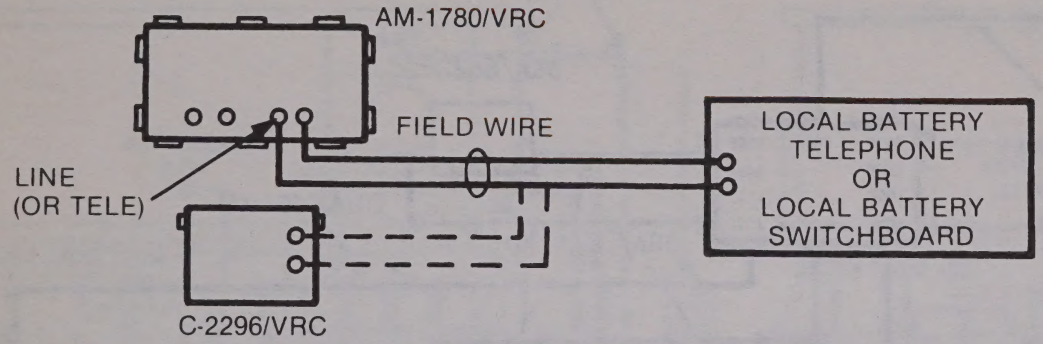
NOTE: For use with Intercom Set AN/VIC-1 and VINSON COMSEC equipment for Radio Relay Operation.



X - VEHICLE WIRING

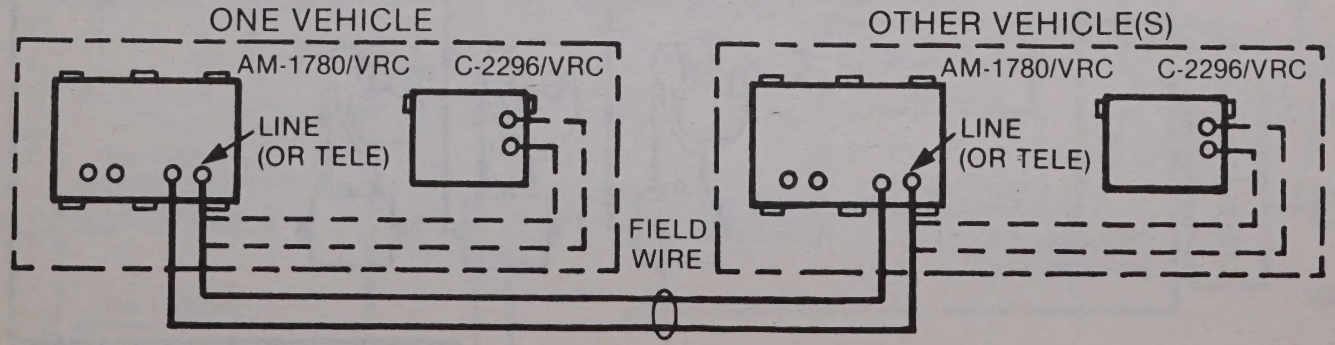
2-70.1 TYPICAL CABLING FOR TELEPHONE COMMUNICATION TO VEHICLE INTERCOM OR FOR INTERCOM CONNECTION BETWEEN VEHICLES.

TELEPHONE CONFIGURATION



Use field wire to interconnect telephone or switchboard to AM-1780/VRC (or C-2296/VRC) intercom system.

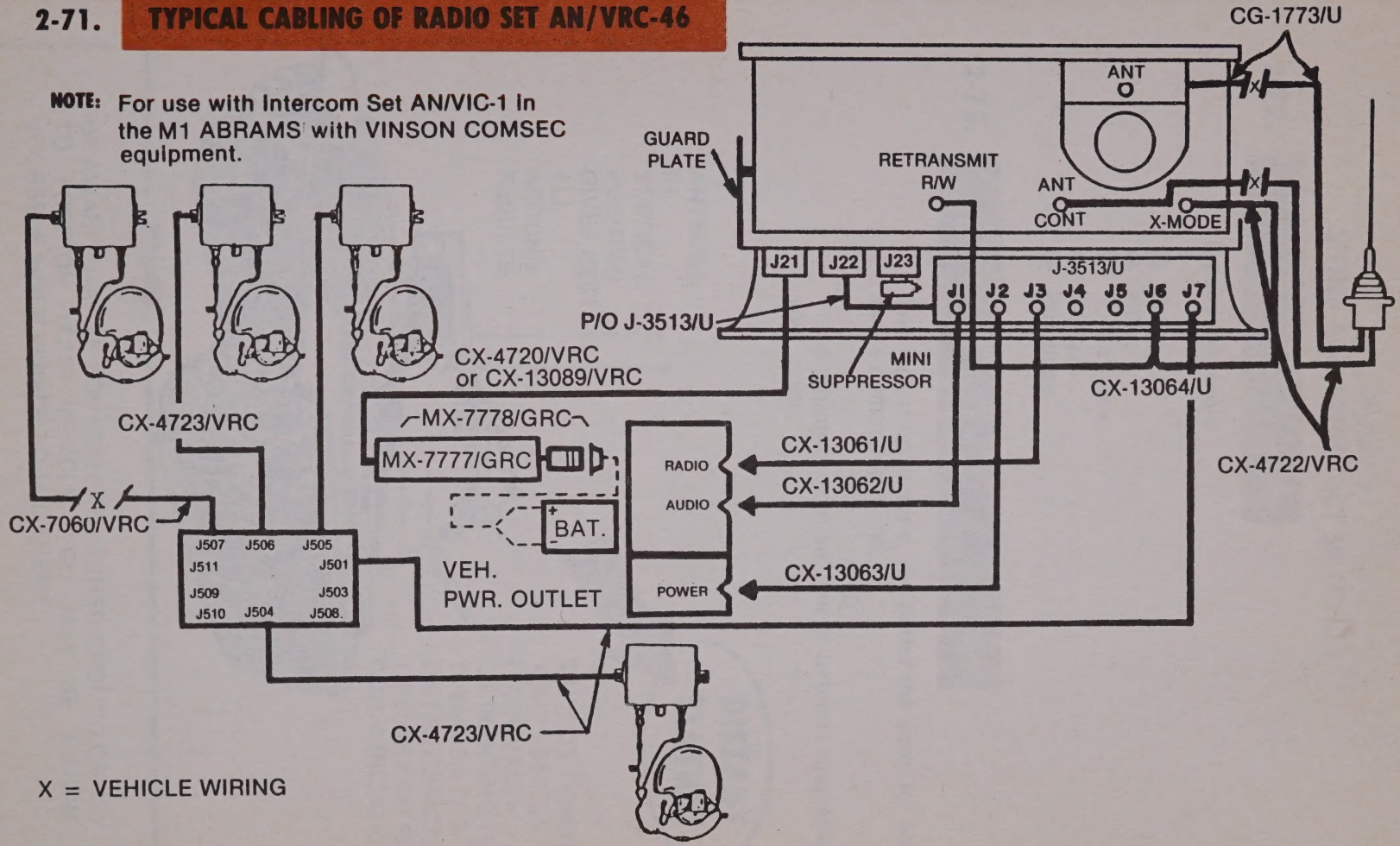
VEHICLE-TO-VEHICLE CONFIGURATION



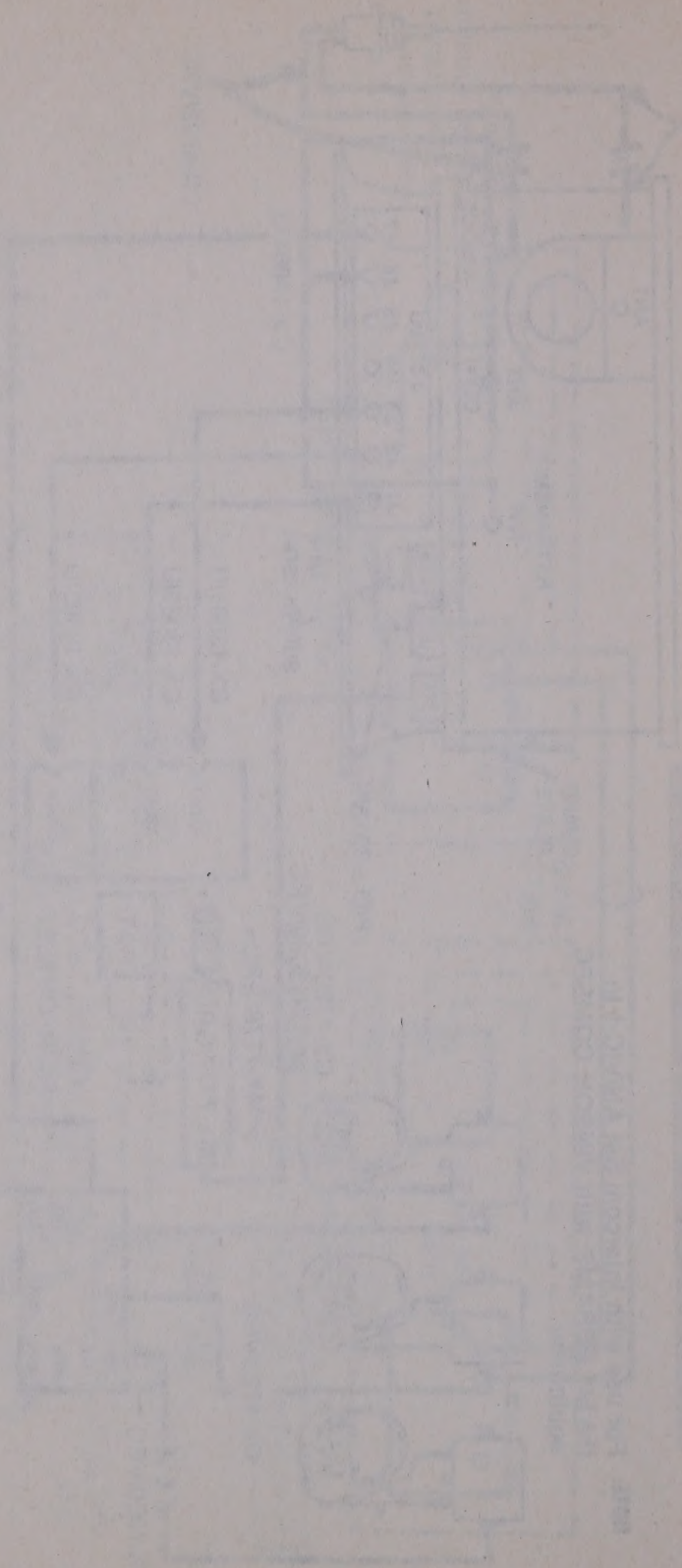
Use field wire to interconnect vehicle intercom systems.

2-71. TYPICAL CABLING OF RADIO SET AN/VRC-46

NOTE: For use with Intercom Set AN/VIC-1 in the M1 ABRAMS with VINSON COMSEC equipment.



X = VEHICLE WIRING



Section V.
SITING AND FREQUENCY SELECTION

2-72. UNDESIRABLE LOCATIONS

If possible, avoid:

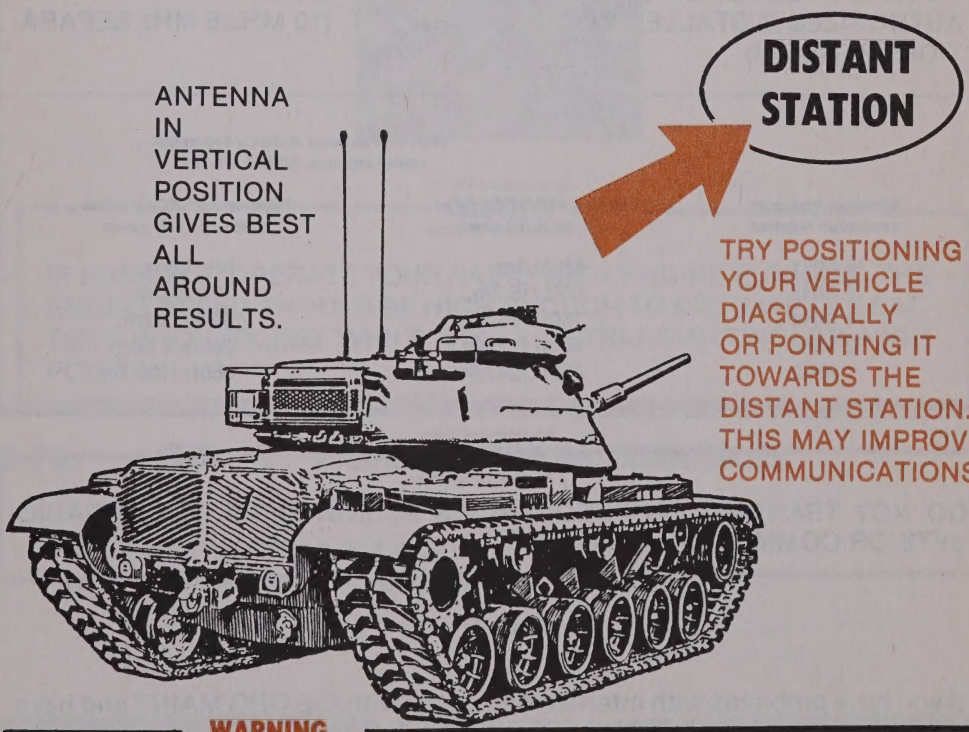
- Trees.
- Hills.
- Power lines.
- Bridges.
- Buildings.

2-73. DESIRABLE LOCATIONS AND POSITIONS

The higher up you are, the better the odds for long range communications.

AND

The position of your vehicle or antenna may affect your range.


DISTANT STATION
ANTENNA IN VERTICAL POSITION GIVES BEST ALL AROUND RESULTS.
TRY POSITIONING YOUR VEHICLE DIAGONALLY OR POINTING IT TOWARDS THE DISTANT STATION. THIS MAY IMPROVE COMMUNICATIONS.

WARNING

BE AWARE THAT AS YOU MOVE TO HIGHER GROUND OR TRY TO POSITION YOUR VEHICLE, YOU MAY BE MAKING YOURSELF MORE VISIBLE TO THE ENEMY.

2-74. AUTHORIZED OPERATING FREQUENCIES

Your authorized frequencies and call signs are found in the Communications Electronics Operation Instructions (CEOI). Carefully check all authorized frequencies and make sure the following CAUTIONS are followed:

CAUTION

DO NOT USE THE FOLLOWING FREQUENCIES IN SOME RADIOS, THEY MAY CAUSE IMPROPER OPERATION: 33.90, 42.50, 56.50, AND 67.80 MHz.

CAUTION

DO NOT USE FREQUENCIES WHICH ARE SEPARATED EXACTLY BY 5.75 MHz or 23.00 MHz.

CAUTION

DO NOT OPERATE TOO CLOSE TO OTHER RADIO SETS. THE FOLLOWING CHART SPECIFIES THE **MINIMUM** DISTANCE YOUR ANTENNA MUST BE FROM ANOTHER ANTENNA WHILE OPERATING AT DIFFERENT FREQUENCY SEPARATIONS. IN VEHICLES, ANTENNAS ARE AUTHORIZED INSTALLED CLOSER THAN 5 FT (10 MHz/5 MHz SEPARATION, MINIMUM).

	Minimum antenna distance separation (whip antenna, RC-292, OE-254)	
Minimum frequency separation required	Between AN/VRC-12 series radio on HIGH power	Between AN/VRC-12 series radios on LOW power
10 MHz	5ft./1.5m.	5ft./1.5m.
7 MHz	60ft./18.3m.	10ft./3.0m.
4 MHz	150ft./45.7m.	50ft./15.2m.
2 MHz	400ft./12.9m.	200ft./61.0m.
1 MHz	800ft./243.8m.	350ft./106.7m.

CAUTION

DO NOT TRANSMIT ON FREQUENCIES ASSIGNED TO OTHER RADIO SETS OR COMMERCIAL STATIONS.

AND

If you have problems with interference, check with C-E ORG MAINT and have them check their INTERFERING FREQUENCIES CHARTS to make sure you are using an interference free frequency.

SECTION VI .
OPERATION UNDER USUAL CONDITIONS

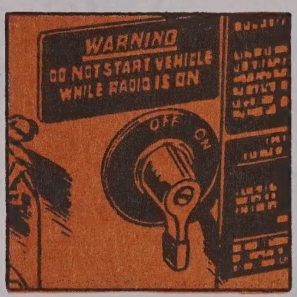
NOTE:

THE FOLLOWING STEP-BY-STEP OPERATING PROCEDURES APPLY TO THE RADIO AND INTERCOM EQUIPMENT WITHOUT ANY VINSON OR NESTOR COMSEC EQUIPMENT BEING CONNECTED TO THE RADIOS.

CAUTION

NEVER START YOUR VEHICLE WHILE THE RADIO OR RADIOS ARE ON.

ALWAYS START YOUR VEHICLE FIRST AND THEN PROCEED TO OPERATE THE RADIO AND INTERCOM EQUIPMENT.



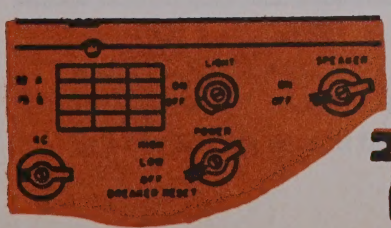
CAUTION

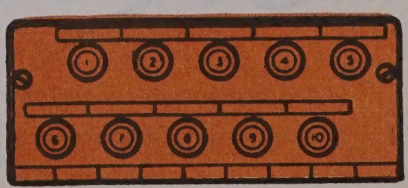
IF POSSIBLE, OPERATE YOUR RADIO WITH ENGINE RUNNING. THE ENGINE SPEED SHOULD BE HIGH ENOUGH TO INDICATE THE BATTERY IS CHARGING WHILE YOU ARE TRANSMITTING ON HIGH POWER.

2-75. STEP 1 RECORD OPERATING FREQUENCIES

* Write your operating and alternate frequencies on the write-in plates on your equipment.

EXAMPLES:



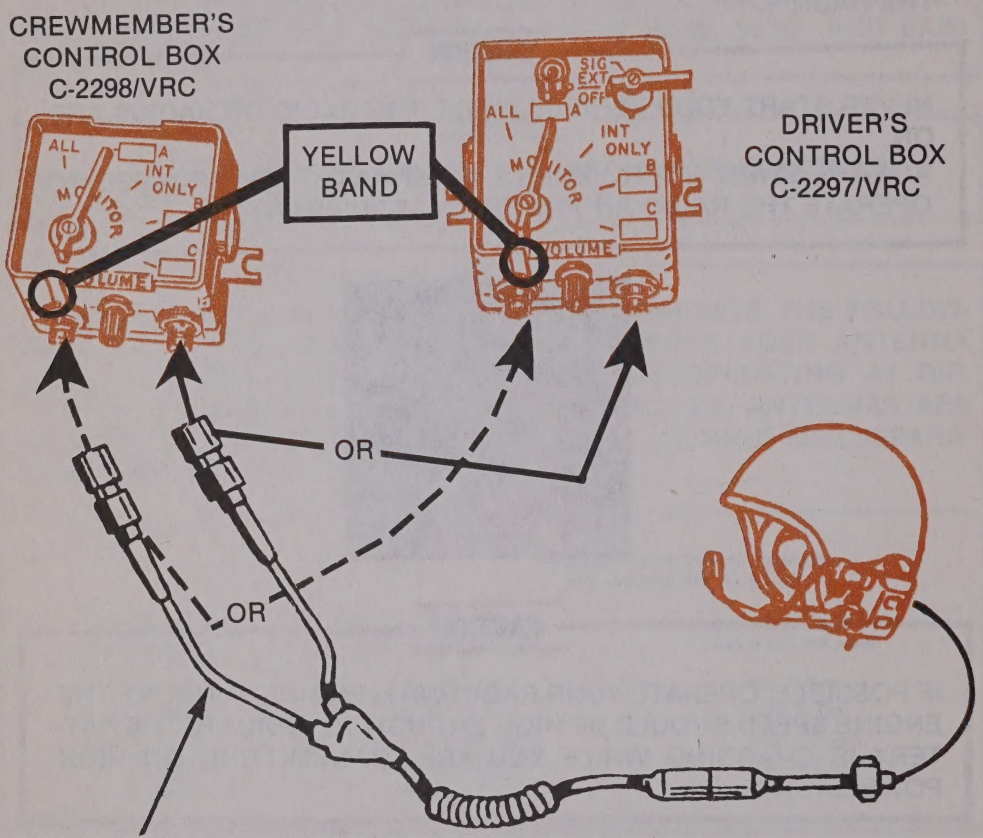


2-76. STEP 2 CONNECT AND ADJUST CVC HELMET

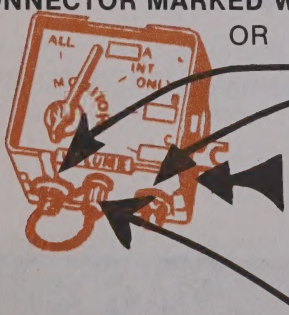
NOTE:

Normally, all CVC HELMETS are connected to a control box and the MONITOR switch on the CONTROL BOX set to a good position like ALL or A.

[A] Typical connection of the two branches from the CVC Helmet.



OR In the M 1 TANK, you CONNECT THE SAME WAY.

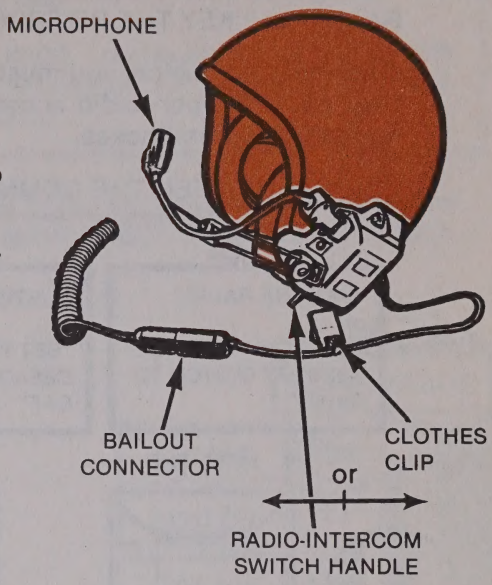


M 1 CREWMEMBER'S
CONTROL BOX
(C-10456/VRC)

BUT

Do not forget to cap the special remote receptacle if it is not used.

2-76. STEP 2 CONNECT AND ADJUST CVC HELMET



B Typical helmet adjustments.

Adjust helmet headband straps to fit your head.

Insert or remove foam rubber sections to get a proper head size.

Make sure the earphone cushion snaps are secure.

Adjust the microphone boom so that the microphone is directly in front of and close to your lips.

C Bailout connections.

Make sure that the bailout connector separates smoothly.

D Clothes clip.

Clip the clothes clip to your clothing so that the upper and lower cord sections will not interfere.

WARNING

DO NOT FASTEN THE CLOTHES CLIP TO ANYTHING THAT DOES NOT STAY WITH YOU WHEN YOU LEAVE THE VEHICLE.

E RADIO-INTERCOM switch handle.

The use of this switch handle is described in the following paragraph.

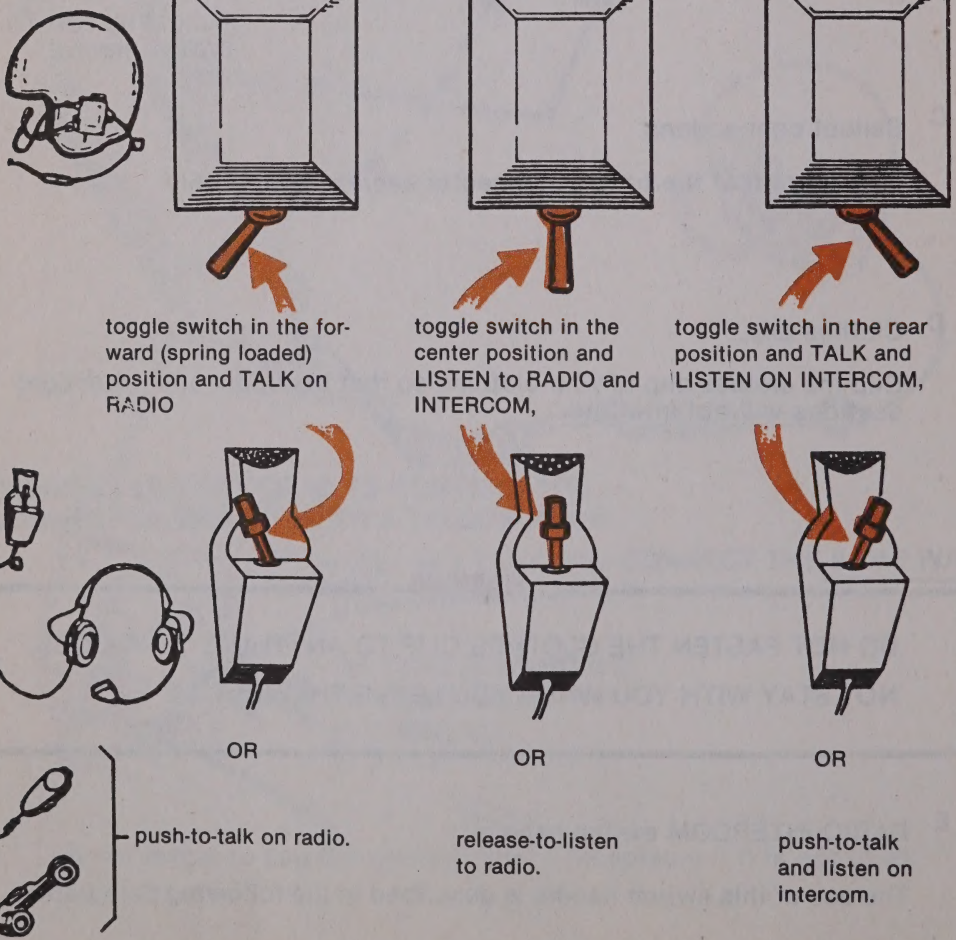
2-77. STEP 3 OPERATION OF AUDIO ACCESSORY CONTROLS

NOTE: Throughout this manual, instructions will be given to "KEY THE RADIO" or " KEY THE INTERCOM" etc.

To prevent confusion, you must understand the following terms as they apply to your audio accessories connected to the intercom equipment control boxes.

WHEN THE COMMANDER ORDERS YOU TO

"KEY THE RADIO" or "SET YOUR AUDIO ACCESSORY SWITCH TO RADIO"	"LISTEN" or "SET YOUR AUDIO ACCESSORY SWITCH TO OFF"	"KEY THE INTERCOM" or "SET THE AUDIO ACCESSORY SWITCH TO INTERCOM"
HOLD THE	PLACE THE	PLACE THE
toggle switch in the forward (spring loaded) position and TALK on RADIO	toggle switch in the center position and LISTEN to RADIO and INTERCOM,	toggle switch in the rear position and TALK and LISTEN ON INTERCOM,
OR	OR	OR
push-to-talk on radio.	release-to-listen to radio.	push-to-talk and listen on intercom.



2-78. STEP 4 INITIAL POWER TURN ON ACTIONS

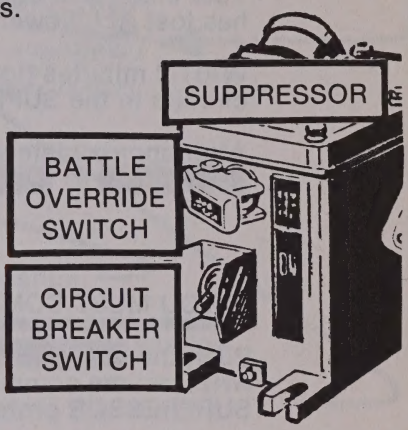
CAUTION

To prevent damage to your equipment, you must always use a SUPPRESSOR (either the MINI-SUPPRESSOR or SUPPRESSOR MX-7777/GRC) in your equipment hookup.

A Make power available for your electronic equipment by operating the proper INSTALLATION/VEHICLE MAIN ELECTRICAL POWER switch.

B Set SUPPRESSOR (MX-7777/GRC) controls.

- CIRCUIT BREAKER TO ON.
  AND
- BATTLE OVERRIDE switch to OFF.

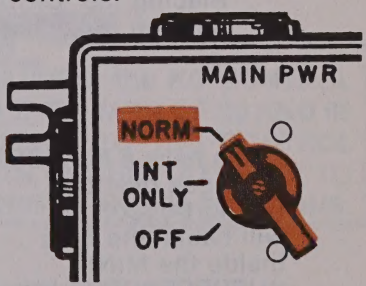


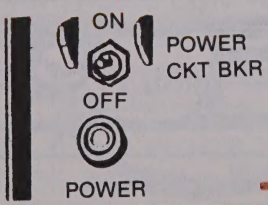
NOTE:

If you have a MINI-SUPPRESSOR, there are no controls to set or adjust.

C Set MAIN JUNCTION BOX-AMPLIFIER controls.

- MAIN PWR switch to NORM.
  AND
- PWR CKT BKR to ON.





CAUTION

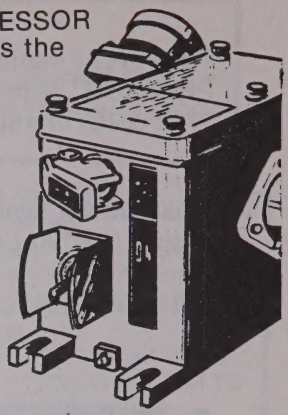
Always set the MAIN PWR switch to NORM first, then set the PWR CKT BKR to ON.

YOU ARE NOW READY TO OPERATE THE RADIO AND INTERCOM EQUIPMENT.

2-79. STEP 5 POWER TURN ON ACTIONS WHILE OPERATING

A

While operating with a system using SUPPRESSOR (MX-7777/GRC), IF TOO MUCH power reaches the SUPPRESSOR:



The CIRCUIT BREAKER will automatically jump to OFF

AND

Your electronic equipment has lost ALL power.

WAIT 2 minutes (for the overload circuits in the SUPPRESSOR to cool off.

After approximately 2 minutes, place the CIRCUIT BREAKER to ON and resume operation.

B

IF YOU MUST COMMUNICATE BEFORE THE 2 MINUTES ARE UP:

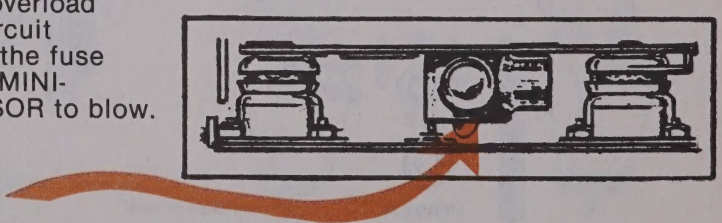
Push the BATTLE OVERRIDE switch to ON AND resume communications--- BUT ---you DO NOT HAVE SUPPRESSOR protection.

After 2 minutes, return the SUPPRESSOR to its normal job of protecting your equipment by

Placing the CIRCUIT BREAKER to ON and the BATTLE OVERRIDE switch to OFF.

NOTE :

If you have a MINI-SUPPRESSOR in your system, a serious overload or short circuit will cause the fuse inside the MINI-SUPPRESSOR to blow.



AND The lamp on the MINI-SUPPRESSOR will light up.

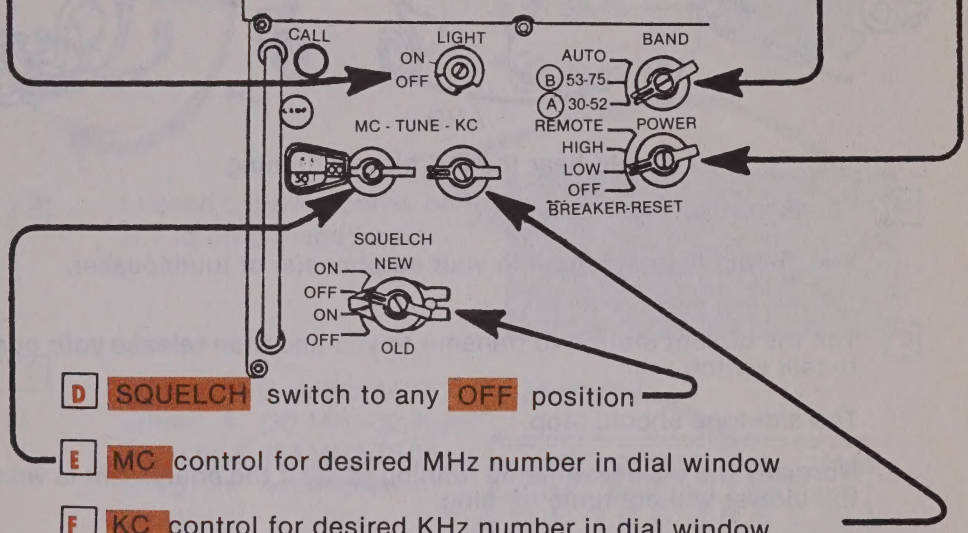
The light tells you that you have lost protection for your electronic equipment. AND You should call C-E ORG MAINT to replace the MINI-SUPPRESSOR. You are not authorized to replace the MINI-SUPPRESSOR.

2-80. STEP 6 MANUAL TUNING THE R-T

A POWER switch to LOW

B LIGHT switch to ON for dial light and power for CALL indicator lamp.

C BAND switch to A or B



D SQUELCH switch to any OFF position

E MC control for desired MHz number in dial window

F KC control for desired KHz number in dial window

NOTE:

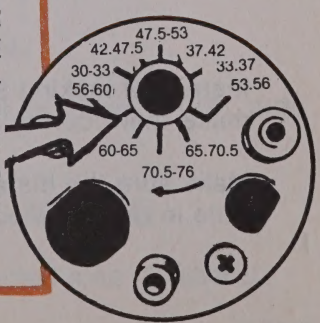
For blackout operation, the LIGHT switch is set to OFF.

CAUTION

IN SOME UNITS OF THE RT-524/VRC, the KC CONTROL CANNOT BE TURNED BEYOND THE LIMITS OF 00 AND 95 POSITIONS. TO PREVENT DAMAGE TO THE CONTROL MECHANISMS OF THESE UNITS, DO NOT ATTEMPT TO TURN THE KC CONTROL BEYOND 00 AND 95 POSITIONS.

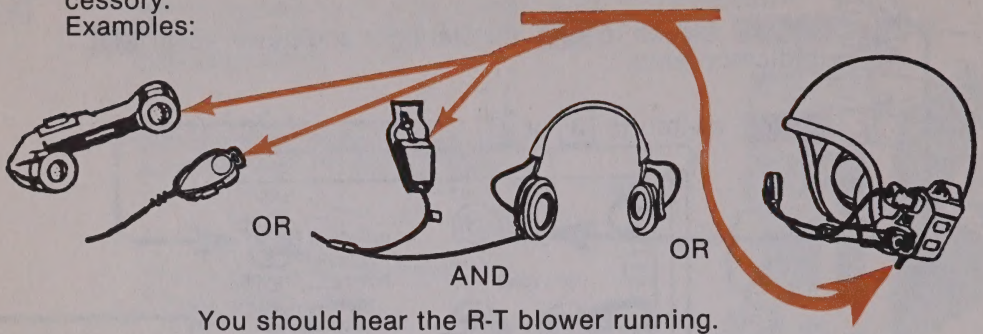
CAUTION

IF YOU ARE USING EITHER THE COMPACT OR ROUND BASE ANTENNA WITHOUT A CABLE CONNECTED FROM THE R-T ANT CONT RECEPTACLE TO THE ANTENNA MATCHING UNIT, YOU MUST MANUALLY SET THE BAND CONTROL ON THE BOTTOM OF THE ANTENNA MATCHING TO A POSITION THAT INCLUDES THE OPERATING FREQUENCY OF THE R-T.



2-81. STEP 7 ESTABLISH INITIAL COMMUNICATIONS

A Key your R-T by pressing the push-to-talk switch to your audio accessory.
Examples:



You should hear the R-T blower running.

B Speak into your microphone.

You should hear sidetone in your earphone(s) or loudspeaker.

C Tell the distant station to transmit to you and then release your push-to-talk switch.

The sidetone should stop.

Normally the blower will stop running BUT if the equipment is warm, the blower will continue running.

D Listen to your loudspeaker or earphone(s) for the signal from the distant station.

Adjust your VOLUME control for a comfortable listening level.

E If you cannot reach the distant station on LOW power, repeat the above procedures with the POWER switch set to HIGH.

F After establishing communications,you may use SQUELCH operation if desired.

Set the SQUELCH switch to NEW ON or OLD ON as appropriate.

NOTE:

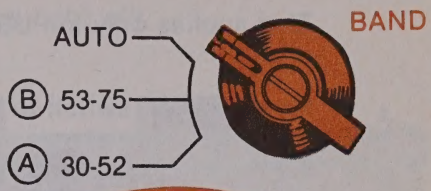
Instead of making SQUELCH settings at this time, it is possible to make them during STEP 6 R-T OPERATION, MANUAL TUNING.
---BUT---
Make sure the distant station and you have your SQUELCH controls in the same position.

2-82. STEP 8 R-T SETUP FOR PUSHBUTTON OPERATION

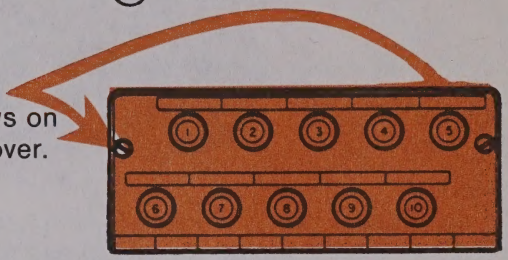
NOTE:

This applies only to the PUSHBUTTON R-T (RT-246(*)/VRC).

A Move BAND switch to AUTO.

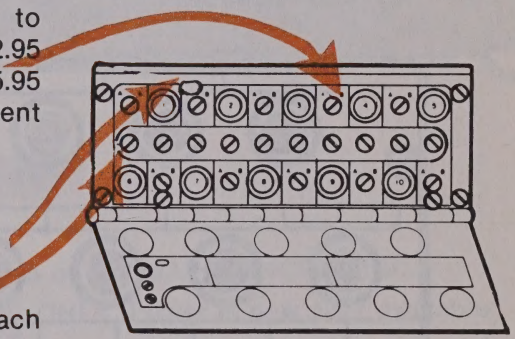


B Loosen captive screws on R-T to drop hinged cover.



C Turn BAND selector to either A (30 MHz-52.95 MHz) or B (53 MHz-75.95 MHz) for each present channel.

D Press in the TUNE button and adjust PRESET control of each corresponding pushbutton to the correct frequency as shown in the DAIL WINDOW. Release the TUNE button to lock in the frequency for each preset pushbutton.



E After setting a preset pushbutton, check accuracy of your adjustments.

- Change frequency, either manually or with another pushbutton.
- Press pushbutton for each channel you preset.
- R-T should tune to exact frequency you preset as shown in DIAL WINDOW.

F Tune the pushbutton as required (STEPS C and D).

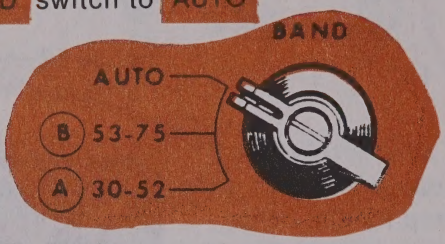
G Check each preset pushbutton setup (repeat step E above).

2-83. **STEP 9 R-T PUSHBUTTON OPERATION**

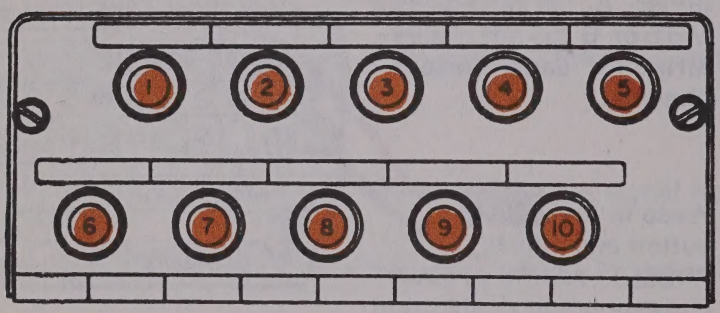
NOTE:

This applies only to PUSHBUTTON R-T (RT-246(*)/VRC).

A Move BAND switch to AUTO



B Repeat previous steps [6] for turn on, BUT instead of manually tuning the R-T, press the pushbutton already preset to the desired frequency.



The tuner in the R-T will operate each time you press a pushbutton and automatically tune the receive and transmit circuits in the R-T.

CAUTION

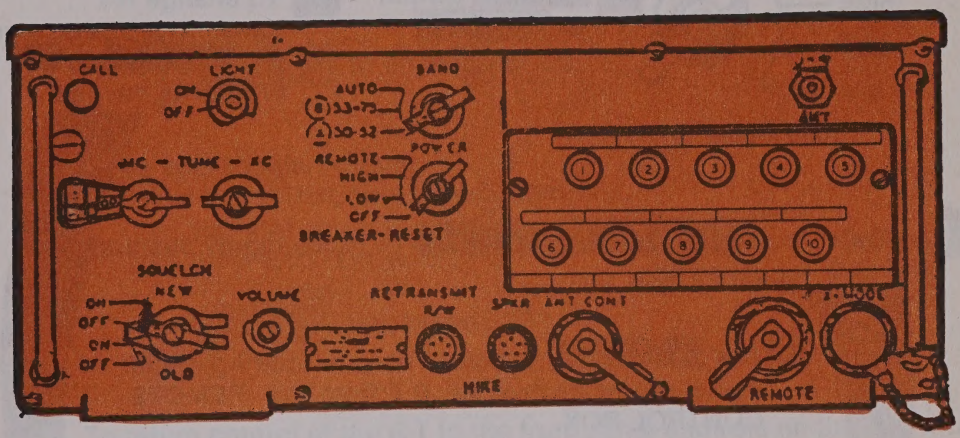
WAIT FOR THE TUNER TO STOP OPERATING BEFORE YOU CONTINUE. THIS TUNER ALSO AUTOMATICALLY TURNS THE DIAL NUMBERS TO THE FREQUENCY OF THE CHANNEL YOU HAVE SELECTED.

C Establish communications with the distant station following the procedures in STEP 7

2-84. STEP 10 R-T TURN OFF PROCEDURES

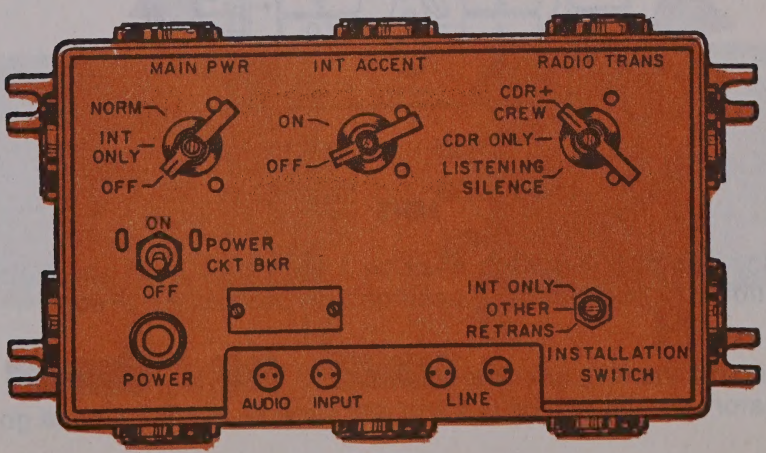
A Turn the R-T POWER switch to OFF.

*This will turn off the R-T and the dial light will go out.



OR

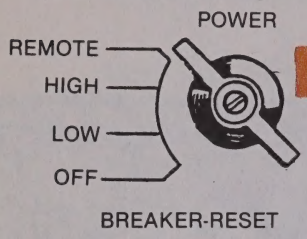
B Place the MAIN PWR switch on the MAIN JUNCTION BOX-AMPLIFIER to OFF or INT ONLY. Power is now NOT available for the R-T or any radio.



2-85. STEP 11 REMOTE CONTROL OPERATION OF PUSHBUTTON R-T

NOTE:

This step applies only to PUSHBUTTON R-T (RT-246(*)/VRC with pushbuttons operating properly and REMOTE CONTROL BOX (C-2742/VRC) connected to the R-T REMOTE receptacle.



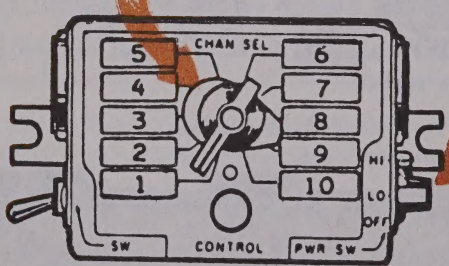
A POWER switch to REMOTE

B To change R-T transmitter power, turn the PWR SW to HI or LO as desired.

C Activate your REMOTE CONTROL BOX by momentarily pushing the SW toggle switch.

D The CONTROL indicator lamp should light and you can now control the R-T from the REMOTE CONTROL BOX.

E To change R-T operating frequency, turn the CHAN SEL switch to the position that has been assigned to the desired frequency.



NOTE

On the CHAN SEL switch position 1 corresponds to pushbutton 1; position 2 to pushbutton 2; position 3 to pushbutton 3; etc.

F To turn off the R-T, turn the PWR SW to OFF the CONTROL indicator lamp should go out and dial lamp on the R-T should go out.

2-86. STEP 12 TANDEM OPERATION OF REMOTE CONTROL BOXES

NOTE:

In TANDEM operation of 2 REMOTE CONTROL BOXES (C-2742/VRC) only one REMOTE CONTROL BOX can control the PUSHBUTTON R-T.

Consider yourself as the operator of REMOTE CONTROL BOX "A".

A Place your PWR SW to either HI or LO.

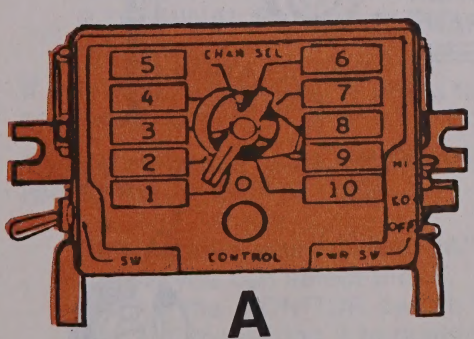
B Press your toggle switch:
Your CONTROL lamp should light up to tell you that you now have control of the PUSHBUTTON R-T.
and
the CONTROL lamp on box "B" should go out.

C To return control of the R-T to the front panel controls on the R-T, turn the POWER switch on the R-T from REMOTE to HIGH or LOW.

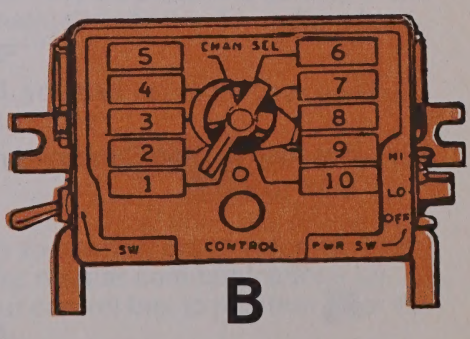
NOTE:

In TANDEM operation, ONLY the REMOTE CONTROL BOX connected to the PUSHBUTTON R-T can turn the R-T on and off. In the drawing shown, this is box "A".

To R-T REMOTE receptacle



A

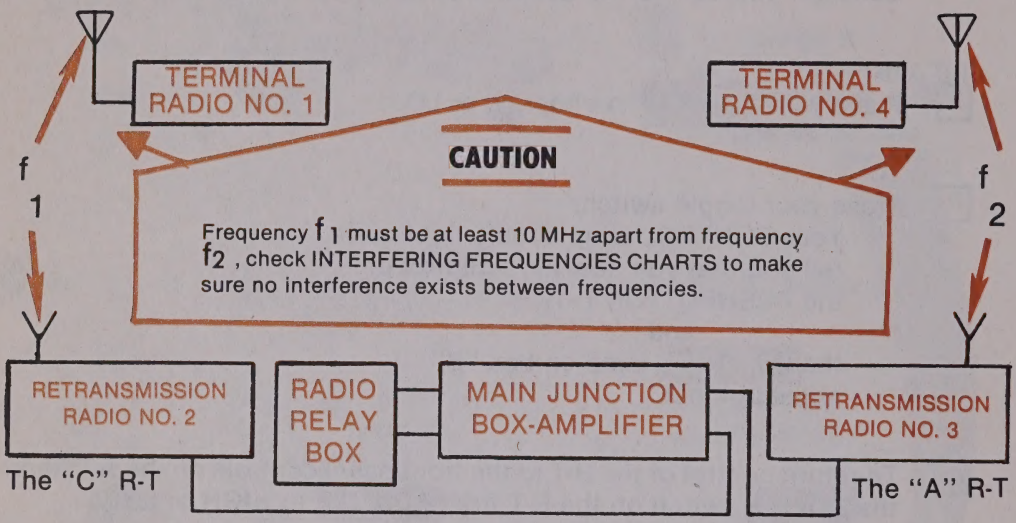


B

2-87. STEP 13 BASIC RADIO RELAY OPERATION

NOTE:

This applies to Radio Sets AN/VRC-45 and AN/VRC-49 which are arranged for radio relay operation using the RADIO RELAY BOX (C-2299/VRC).

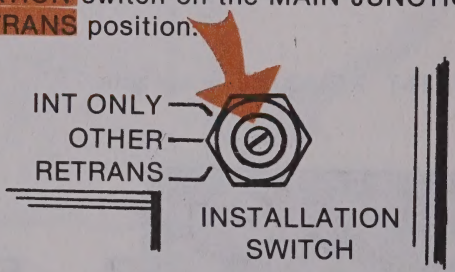

TERMINAL RADIO NO. 1
TERMINAL RADIO NO. 4
f 1
f 2
CAUTION
Frequency f 1 must be at least 10 MHz apart from frequency f2 , check INTERFERING FREQUENCIES CHARTS to make sure no interference exists between frequencies.
RETRANSMISSION RADIO NO. 2
RADIO RELAY BOX
MAIN JUNCTION BOX-AMPLIFIER
RETRANSMISSION RADIO NO. 3
The "C" R-T
The "A" R-T

RADIO SET AN/VRC-45 OR AN/VRC-49

NOTE:

C-E ORG MAINT has the INTERFERING FREQUENCIES CHARTS.

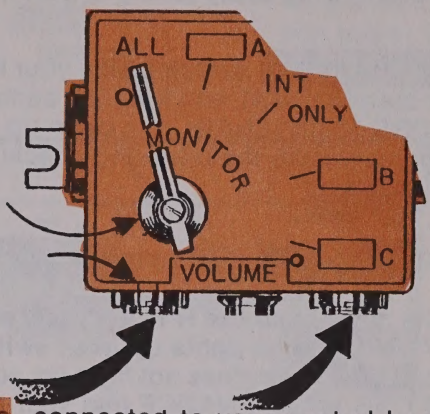
Make sure the INSTALLATION switch on the MAIN JUNCTION BOX-AMPLIFIER is in the RETRANS position.



Set the RETRANS switch on the RADIO RELAY BOX to OFF.

2-87. STEP 13 BASIC RADIO RELAY OPERATION - Continued

C Set the MONITOR switch on your control box to C. This will enable you to communicate with TERMINAL RADIO NO. 1 using your "C" R-T.



D Use the audio accessories connected to your control box to establish satisfactory communications between TERMINAL RADIO NO. 1 and your "C" R-T on frequency f1.

E Set the MONITOR switch on your control box to position A. This will enable you to communicate with TERMINAL RADIO NO. 4 using your "A" R-T.

F Use the audio accessories connected to your control box to establish satisfactory communications between TERMINAL RADIO NO. 4 and your "A" R-T on frequency f2.

G Notify each TERMINAL RADIO to communicate with each other.

BUT - make sure that all R-T's in the relay hookup have their SQUELCH controls in the same SQUELCH mode.

H Place the RETRANS switch on the RADIO RELAY BOX to ON.

Now your 2 R-T's (The "C" R-T and "A" R-T) are under the control of the 2 TERMINAL RADIOS as they automatically operate for radio relay operation.

I If you want to hear what is being relayed, you can listen on your audio accessories connected to your control box.

J To stop automatic radio relay operation, turn the RETRANS switch on the RADIO RELAY BOX to OFF.

This permits your "C" and "A" R-T's to operate independently. This means you can select the "C" R-T for regular communications by placing the MONITOR switch on your control box to position C or the "A" R-T by placing it to position A.

NOTE

Remember, only NESTOR COMSEC equipment can be used in this radio relay hookup with RADIO RELAY BOX C-2299/VRC.

2-88. **STEP 14 X-MODE OPERATION: with any R-T OR ANY AUX RECEIVER**

NOTE:

The following apply to any R-T on any type R-T MOUNT.

The X-MODE - NORMAL switch inside your R-T should be in the X-MODE position for both NORMAL and X-MODE communications. You do not have to ask C-E ORG MAINTENANCE to open up your R-T to check the switch position. You can make the following check:

A Turn your R-T ON .

B Set the R-T SQUELCH control to OLD ON .

C Remove the cover from the R-T X-MODE receptacle. AND
If your R-T CALL lamp lights up, your switch is in X-MODE .
BUT if your CALL lamp does not light up, your switch is in NORMAL . AND
Notify C-E ORG MAINTENANCE that your switch needs changing.

NOTE:

The following apply when an AUX RECEIVER is mounted on a regular AUX RECEIVER mount.

★The AUX RECEIVER internal X-MODE - NORMAL switch must always be in the NORMAL position.
AND You can only operate NORMAL (in the clear or not secure).

NOTE:

The following apply when an AUX RECEIVER is mounted on a VINSON AUX RECEIVER MOUNT.

★The AUX RECEIVER's internal X-MODE - NORMAL switch must always be in the X-MODE position.
AND
You can operate either in the clear or secure (cipher or X-MODE) by properly using the VINSON COMSEC EQUIPMENT controls.

CAUTION

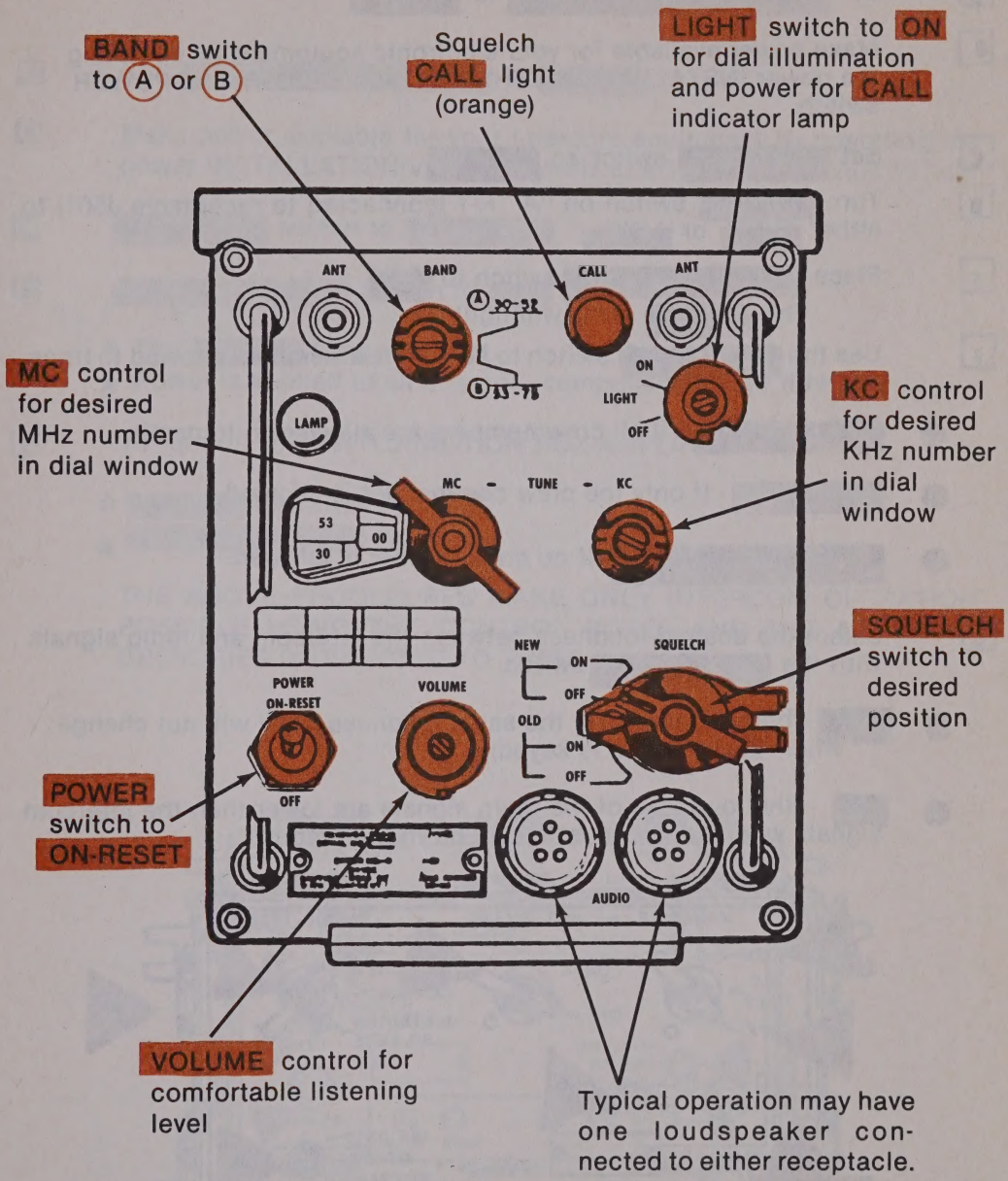
AN OPERATOR IS NOT AUTHORIZED TO OPEN ANY RADIO TO MAKE ADJUSTMENTS, IF YOU THINK THAT YOUR RADIO'S X-MODE-NORMAL SWITCH MUST BE CHANGED, NOTIFY C-E ORG MAINTENANCE.

NOTE:

Should it be necessary to familiarize yourself with COMSEC EQUIPMENT,ask your supervisor for the following manuals.

FOR VINSON COMSEC EQUIPMENT: TM 11-5810-256-12, TM 11-5810-256-OP-4 and TM 11-5810-312-12.
FOR NESTOR COMSEC EQUIPMENT: TM 11-5810-290-14&P and TM 11-5810-300-12.

2-89. STEP 15 AUX RECEIVER OPERATION



CAUTION

FOR BLACKOUT OPERATION THE LIGHT SWITCH IS SET TO OFF

2-90. STEP 16 NORMAL RADIO OPERATION WITH MAIN JUNCTION BOX-AMPLIFIER

A Set INSTALLATION SWITCH to OTHER.

B Make power available for your electronic equipment by operating the power INSTALLATION/VEHICLE MAIN ELECTRICAL POWER switch.

C Set MAIN PWR switch to NORM.

D Turn POWER switch on "A" R-T (connected to receptacle J501) to either HIGH or LOW.

E Place POWER CKT BKR switch to ON.

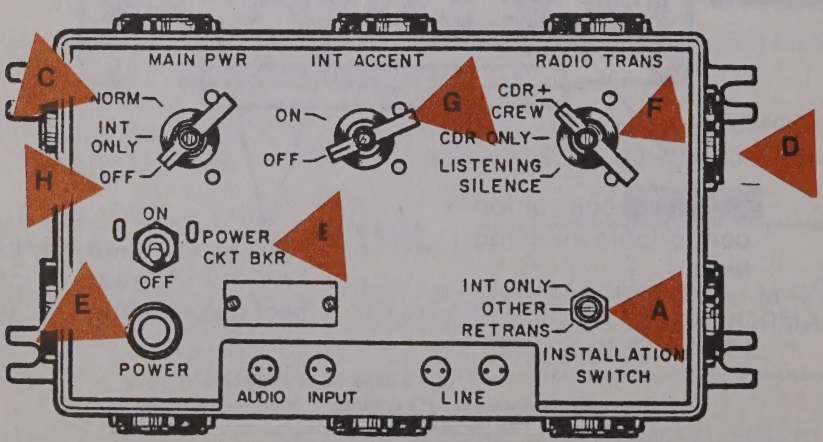
*The POWER lamp will light up.

F Use the RAD TRANS switch to select crewmembers allowed to transmit with the R-T.

- CDR + CREW - if all crewmembers are allowed to transmit.
- CDR ONLY - if only the crew commander is allowed.
- LISTENING SILENCE - if no crewmember is allowed.

G Select the desired loudness between the intercom and radio signals with the INT ACCENT switch.

- OFF ---both signals have the same loudness (they will not change when the intercom is keyed).
- ON ---the loudness of the radio signals are lower than the intercom signals when someone is talking on the intercom.



H To turn off the MAIN JUNCTION BOX-AMPLIFIER and RADIO equipment, turn the MAIN PWR switch to OFF.

2-91. STEP 17 INTERCOM ONLY OPERATION WITH MAIN JUNCTION BOX-AMPLIFIER

[A] Set INSTALLATION SWITCH to OTHER.

[B] Make power available for your intercom equipment by operating the power INSTALLATION/VEHICLE MAIN ELECTRICAL POWER switch.

[C] MAIN PWR switch to INT ONLY.

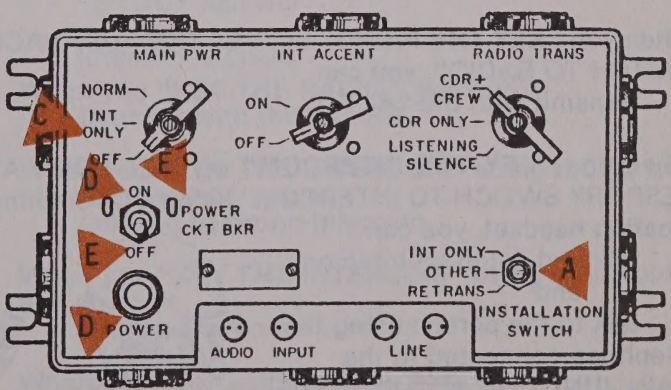
[D] POWER CKT BKR switch to ON.

★ The POWER lamp will light.
★ Power is applied to all intercom components.

[E] To turn off the MAIN JUNCTION BOX-AMPLIFIER:

★ MAIN PWR switch to OFF
★ POWER CKT BKR to OFF.

THE ABOVE PROCEDURES MAKE ONLY INTERCOM OPERATION POSSIBLE USING THE CONTROL BOXES AND THE AUDIO ACCESSORIES CONNECTED TO THEM.



CAUTION

DO NOT PLACE THE INSTALLATION SWITCH TO INT ONLY POSITION WHEN YOUR MAIN JUNCTION BOX IS CONNECTED TO A RADIO SYSTEM.

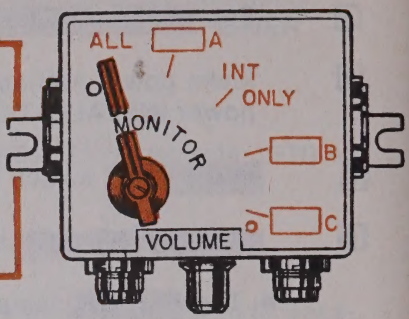
2-92. STEP 18 NORMAL RADIO AND INTERCOM OPERATION WITH CREWMEMBER'S CONTROL BOX

NOTE:

Refer to paragraph 2-77 for a review of the keying terms.

CAUTION:

WHEN YOU "KEY THE RADIO" IN THE STEPS LISTED BELOW, YOU WILL BE CUT OFF IF ANOTHER CREWMEMBER "KEYS" THE INTERCOM WHILE YOU ARE TRANSMITTING.



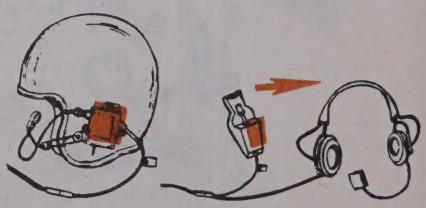
MONITOR switch position

ALL

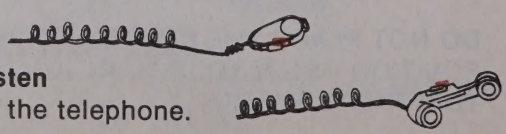
When you **"LISTEN"** or "SET THE AUDIO ACCESSORY SWITCH TO OFF", **you** can **hear** the
"A" R-T and "B" AUX receiver and "C" AUX receiver
and
intercom signals
and
a person taling on the telephone connected to the MAIN JUNCTION BOX-AMPLIFIER **or** OUTSIDE CONTROL BOX
and
the receiver connected to the AUDIO terminals on the MAIN JUNCTION BOX.

When you **"KEY THE RADIO"** or "SET THE AUDIO ACCESSORY SWITCH TO RADIO", **you** can
transmit with the "A" R-T

When you **"KEY THE INTERCOM"** or "SET YOUR AUDIO ACCESSORY SWTICH TO INTERCOM" using a **CVC** helmet or **combination headset,** you can
talk and listen on intercom
and
talk to the person using the telephone connected to the MAIN JUNCTION BOX-AMPLIFIER or OUTSIDE CONTROL BOX.



When you **"KEY THE INTERCOM"** using a **microphone** or **handset,** you can
talk on intercom
or **talk** and **listen**
to the operator of the telephone.



2-92. STEP 18 NORMAL RADIO AND INTERCOM OPERATION WITH CREWMEMBER'S CONTROL BOX.Continued

A

When you **"LISTEN"** or "SET THE AUDIO ACCESSORY SWITCH TO OFF," **you** can **hear** the
"A" R-T
and
intercom signals.

When you **"KEY THE RADIO"** or "SET THE AUDIO ACCESSORY SWITCH TO RADIO," **you** can
transmit with the "A" R-T.

When you **"KEY THE INTERCOM"** or "SET YOUR AUDIO ACCESSORY SWITCH TO INTERCOM" using a **CVC** helmet or combination headset, **you** can
talk and **listen** on intercom.

When you **"KEY THE INTERCOM"** using a microphone or handset **you** can
talk on intercom.

INT ONLY

When you **"LISTEN,"** **you** can **hear**
intercom signal **only.**

When you **"KEY THE INTERCOM"** using a **CVC** helmet or combination headset, **you** can
talk and **listen** on intercom.

When you **"KEY THE INTERCOM"** using a microphone or handset, **you** can
talk on the intercom.

B

When you **"LISTEN,"** **you** can **hear** the
"B" AUX receiver
and
intercom signals.

When you **"KEY THE RADIO,"** **you** can
transmit with the "A" R-T.

When you **"KEY THE INTERCOM"** using a **CVC** helmet or combination headset, **you** can
talk and **listen** on intercom.

When you **"KEY THE INTERCOM"** using a microphone or handset, **you** can
talk on intercom.

C

When you **"LISTEN,"** **you** can hear the
"C" R-T or "C" AUX receiver.

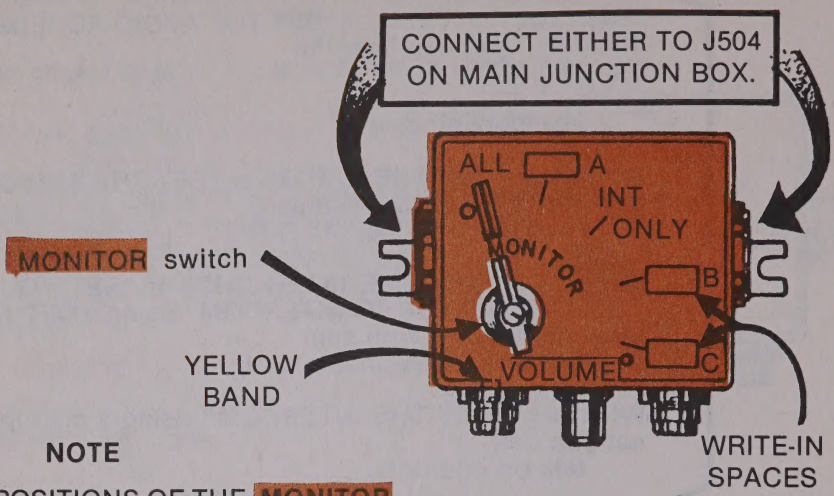
When you **"KEY THE RADIO,"** **you** can
transmit with the "C" R-T.

NOTE: As a crewmember you cannot **talk** on intercom.

VOLUME CONTROL is adjusted for a comfortable listening level.

2-93.

STEP 19 NORMAL RADIO AND INTERCOM OPERATION WITH COMMANDER'S CONTROL BOX



NOTE

ALL POSITIONS OF THE MONITOR SWITCH OPERATE THE SAME AS THEY DID ON THE CREWMEMBER'S CONTROL BOX EXCEPT FOR POSITION C.

NOTE

WHEN A CREWMEMBER'S CONTROL BOX IS CONNECTED TO RECEPTACLE **J504** ON THE MAIN JUNCTION BOX-AMPLIFIER, IT BECOMES A COMMANDER'S CONTROL BOX. THIS SPECIAL CONNECTION MAKES THE COMMANDER THE **MASTER OF THE RADIOS.** WHEN HE IS TRANSMITTING, **NO CREWMEMBER CAN INTERRUPT HIM** BY "KEYING THE INTERCOM".

POSITION C

When the COMMANDER **"LISTENS",** he can hear the "C" R-T or "C" AUX receiver.

During "KEY THE RADIO", he can **transmit** with the "C" R-T.

During "KEY THE INTERCOM" using a CVC helmet or combination handset, he can **talk** and **listen** on intercom

VOLUME control is adjusted by the COMMANDER for a comfortable listening level.

2-94. **STEP 20 NORMAL OPERATION WITH DRIVER'S CONTROL BOX (C-2297/VRC)**

NOTE:

For NORMAL radio and intercom operation using the DRIVER'S CONTROL BOX, the instructions in paragraph 2-92 apply.

BUT

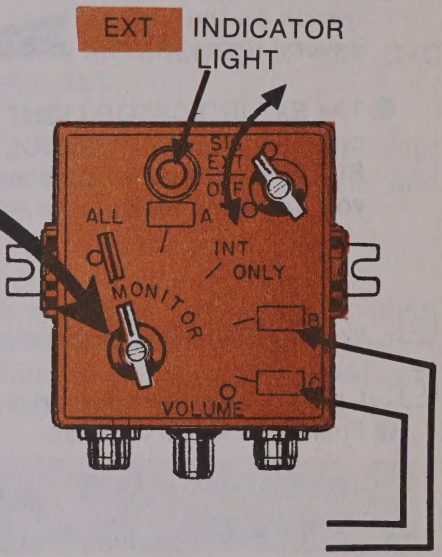
When operating with the OUTSIDE CONTROL BOX (C-2296/VRC), the following steps should be followed:

Consider yourself as the driver in these steps.

A Signal the OUTSIDE CONTROL BOX.

Place your MONITOR switch to INT ONLY
and
move your SIG-EXT-OFF switch from EXT to SIG several times.

Your EXT INDICATOR LIGHT
and
the OUTSIDE CALL LAMP will light each time you go to the SIG position.



B Communicate with the person at the OUTSIDE CONTROL BOX. Place your SIG-EXT-OFF switch to EXT (your EXT INDICATOR LIGHT will stay lighted).
and
"KEY THE INTERCOM" at your CVC helmet.

NOTE:

While you are communicating in this manner, all other crewmembers can hear. They can talk to the person at the OUTSIDE CONTROL BOX using "KEY THE INTERCOM".

C **Connect** the OUTSIDE CONTROL BOX operator to the radio(s) he desires to hear or to transmit with by turning your MONITOR switch to the position that includes the desired radio.

D When the OUTSIDE CONTROL BOX operator is through, turn your SIG-EXT-OFF switch to OFF.

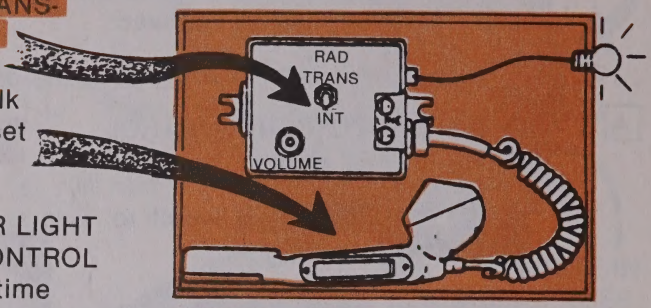
Your EXT INDICATOR LIGHT will go out.

2-95. STEP 21 NORMAL OPERATION WITH OUTSIDE CONTROL BOX (C-2296/VRC)

Consider yourself as the OUTSIDE CONTROL BOX operator in the following steps:

A Signal the driver.

- Leave your RAD-TRANS-INT switch at INT and
- press the push-to-talk switch on the handset several times.
- The EXT INDICATOR LIGHT on the DRIVER'S CONTROL BOX will light each time you press the switch.



B Wait for the driver to place his SIG-EXT-OFF switch to EXT.

AND THEN

C Communicate with the driver using your handset.

- Push-to-talk and to-listen.

NOTE:

The communications is only on intercom.

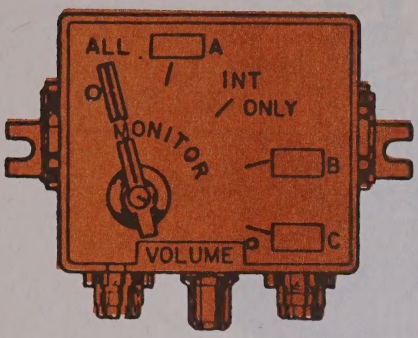
D If you desire to listen to a radio or transmit on an R-T, tell the driver and he will

- Select the proper radio by turning his MONITOR switch to the correct position.
- To transmit with an R-T, hold your RAD TRANS-INT switch in the RAD TRANS position with one hand and with the other hand, push-to-talk and release-to-listen.

E Your VOLUME control only affects the loudness of the signal you hear.

F When your communications are finished, the driver will turn his SIG-EXT-OFF switch to OFF.

2-96. STEP 22 NORMAL OPERATION WITH A TELEPHONE CONNECTED TO THE MAIN JUNCTION BOX-AMPLIFIER



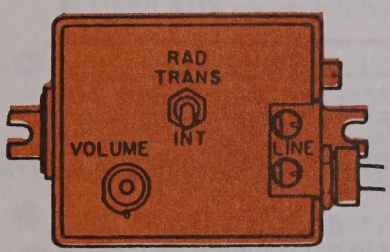
A All persons inside the vehicle can communicate with the person using the telephone.

Turn you control box MONITOR switch to ALL
and
"LISTEN" or "SET YOUR AUDIO ACCESSORY SWITCH TO OFF" to **hear**
and
"KEY THE INTERCOM" at your CVC helmet to **talk**
or
"KEY THE INTERCOM" with your microphone or handset to talk and release it to listen.

NOTE:

The handset or microphone should be connected to the YELLOW BAND receptacle on your control box when you want to talk to the user of the telephone. You must reconnect the handset or microphone to the other receptacle on your control box if you want to talk on the radio.

2-97. STEP 23 NORMAL OPERATION WITH A TELEPHONE CONNECTED TO THE MAIN JUNCTION BOX-AMPLIFIER



NOTE:

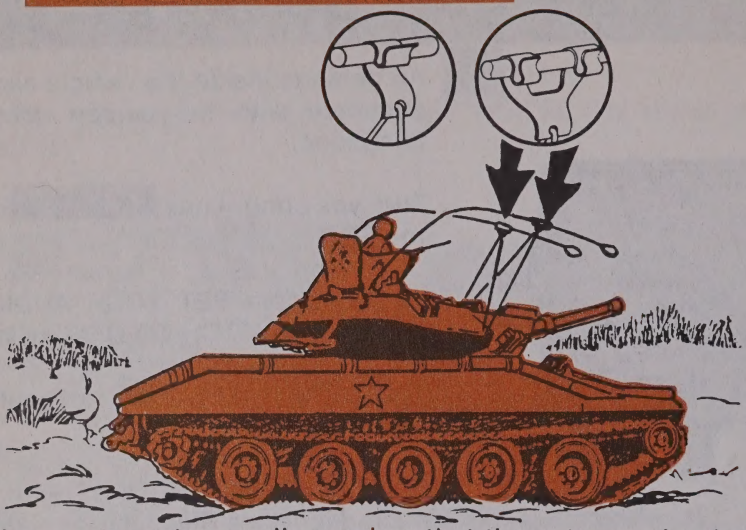
A telephone connected to the LINE binding posts on the OUTSIDE CONTROL BOX (C-2296/VRC) is electrically connected as a telephone connected to the MAIN JUNCTION BOX-AMPLIFIER.

Follow the procedures in the above paragraph for normal communications with a telephone connected to the OUTSIDE CONTROL BOX.

CAUTION

WHEN USING AN EXTERNAL TELEPHONE, **DO NOT** CRANK OR RING TO SIGNAL THE PERSONS INSIDE THE VEHICLE. SIGNALING SHOULD BE DONE BY TALKING OR WHISTLING.

2-98. PREPARATION FOR MOVEMENT



Routine movement normally requires that the antennas be tied-down.

CAUTION

MAKE SURE THAT ANTENNAS ARE SECURELY FASTENED TO PREVENT SNAPPING OUT DURING ROAD/RAIL MOVEMENT, ANTENNAS DO NOT CROSS EACH OTHER, ANTENNA TIP IS IN PLACE AND THAT THE ANTENNA DOES NOT EXTEND BEYOND THE SIDES OF THE VEHICLE.

WARNING

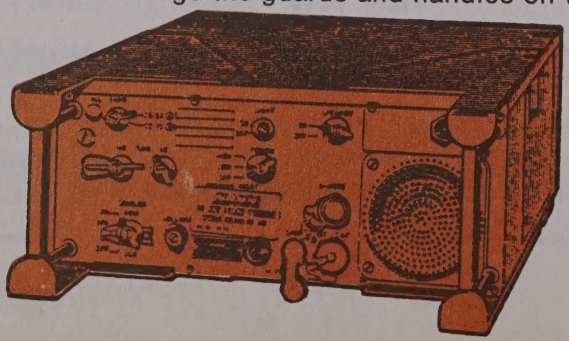
WITH THE ANTENNA TIED DOWN IN THE SECURE POSITION, DAMAGE TO THE WHIP CAN OCCUR IF THE WHIP CONTACTS ANY FIXED OBJECT SUCH AS OVERHEAD BRIDGE ETC. THE POSSIBILITY OF SERIOUS OR FATAL INJURY EXISTS TO OUTSIDE PERSONNEL FROM FLYING ANTENNA PARTS.

CAUTION

BEFORE STARTING THE VEHICLE, SHUT OFF ALL POWER TO THE RADIO AND INTERCOM EQUIPMENT.

2-99. PACKING AND SHIPMENT

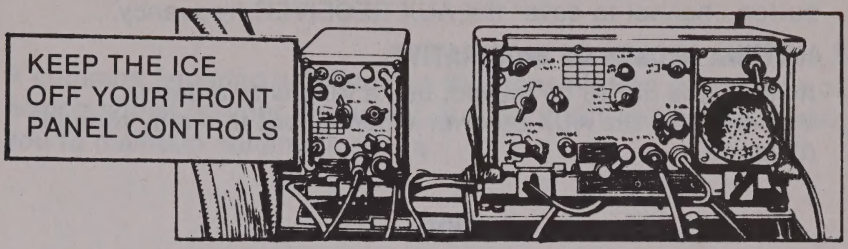
When shipping a radio, tie or brace it in the vehicle or container so it will not bounce around and damage the guards and handles on the front panel.

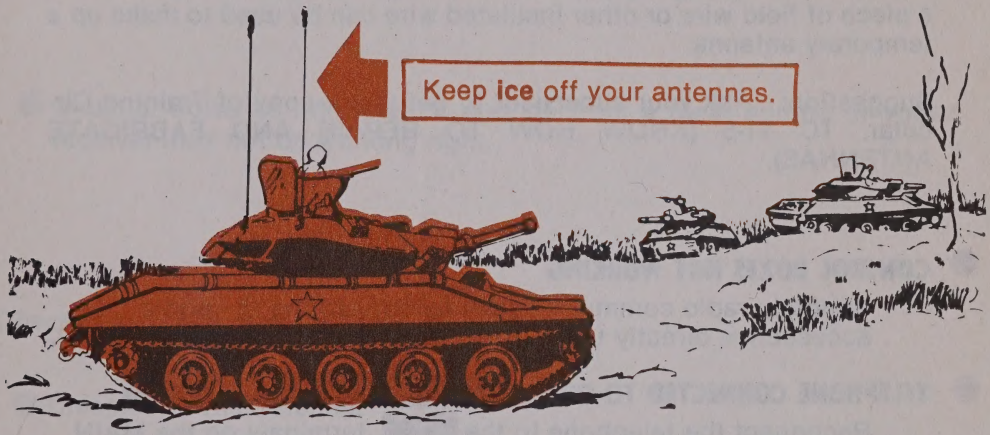


SECTION VII.
OPERATION UNDER UNUSUAL CONDITIONS

2-100. OPERATION AT LOW TEMPERATURES

Keep radio front panel controls free of **ice.**





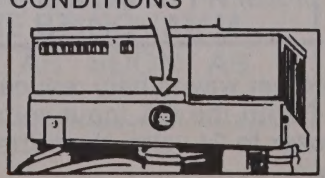
- Do not bend your cables and cords suddenly.
- If possible, keep radio equipment on. If not possible, **warm-up** both the R-T and AUX receivers before operation.
- Make sure that the vehicle charging system can maintain a satisfactory **battery charging rate.**

2-101. OPERATION IN DESERT AND DUSTY AREAS

- Keep **clothing** and other items off the radio.
- If your radio equipment is constantly exposed to the sun, it should be protected with a heat reflecting paint. Request this service from your supporting maintenance group.
- Watch the **water level** in the vehicle battery. Keep it at the proper level.

AND — UNDER ALL CONDITIONS

Make sure the R-T blower port area is free for proper air flow.



2-102. EMERGENCY PROCEDURES

- **AUX RECEIVER FAILS:**

  If you have a PUSHBUTTON R-T (RT-246(*)/VRc), try using a push-button channel to cover the AUX RECEIVER frequency.

- **R-T ANTENNA BROKEN OR INOPERATIVE:**

  If vehicle is not to be moved, use a long wire antenna. You may use the AUX receiver antenna, but this may reduce distance.

NOTE

If you are not moving and you have a broken or unusable whip antenna, a piece of field wire or other insulated wire can be used to make up a temporary antenna.

Suggestion: Ask your supervisor to get you a copy of Training Circular, TC 11-5 (KNOW HOW TO REPAIR AND FABRICATE ANTENNAS).

- **CONTROL BOXES NOT WORKING**

  Maintain radio communications by connecting the audio accessories directly to the front panel of the radio (see pg. 1-43).

- **TELEPHONE CONNECTED TO OUTSIDE CONTROL BOX NOT WORKING**

  Reconnect the telephone to the LINE terminals on the MAIN JUNCTION BOX-AMPLIFIER.

- **RADIO RELAY OPERATION (USING THE MAIN JUNCTION BOX-AMPLIFIER) NOT WORKING:**

  Ask C-E ORG MAINT to try connecting the RADIO RELAY BOX to the R-T MOUNTS.

- **HEAT PROBLEMS-THE R-T BLOWER KEEPS RUNNING WHEN THE R-T IS NOT KEYED AND THE R-T CASE IS WARMER THAN NORMAL**

  Soak a towel or T-shirt in clear water. Wring it out as much as possible. Carefully place it on top of the R-T. Make sure it does not cut off the airflow behind the R-T.

CAUTION

If possible, use this emergency procedure only if your R-T has been checked out during the past 3 months by C-E ORG MAINTENANCE for proper R-T output and proper matching of the R-T to its antenna.

Another way to help reduce the heat generated by the R-T is to operate the R-T with the R-T input voltage at the lower limits (24 to 28 volts dc) - the closer to 24 volts, the better.

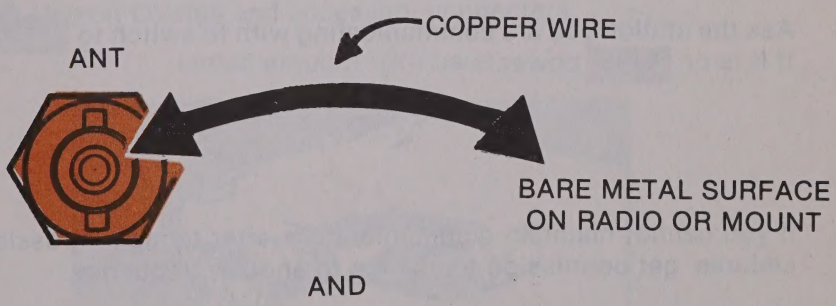
2-103. JAMMING

Recognition and identification of jamming.

- A common jamming procedure is the transmission of a strong or annoying signal on your frequency, making it difficult or impossible for you to maintain communications.
- Sometimes this signal may be from a friendly station.
- Unusual noise or interference may be from a local source or your receiver may not be working right.

Check out your receiver.

- Disconnect the antenna.
- Short out your antenna receptacle to the radio chassis.



AND

If the noise or interference continues, you have a bad receiver.

WARNING

WHEN YOU KNOW THAT YOU ARE BEING JAMMED, NOTIFY YOUR SUPERIOR AS SOON AS POSSIBLE.

2-104. ANTIJAMMING PROCEDURES

- Try to get rid of the effects of the jamming signal by repositioning your vehicle.

- Try to use a nearby obstruction as a screen. Place your vehicle so that the obstruction acts as a screen between you and the possible interfering transmitter site.

- You may get rid of the jamming by pointing your vehicle towards the distant station you are communicating with. Try several vehicle positions.

- Change the setting of your VOLUME control. This may enable you to raise the level of the desired signal enough to be distinguished from the jamming signal.

- Ask the station you are communicating with to switch to HIGH power if it is on LOW power.

- If you cannot maintain communications after trying all possible procedures, get permission to change to another frequency.

WARNING

MAKE SURE ANY ANTIJAMMING ACTION YOU TAKE DOES NOT MAKE YOU AN EASY TARGET FOR THE ENEMY. BE CAREFUL.

CHAPTER 3

MAINTENANCE INSTRUCTIONS

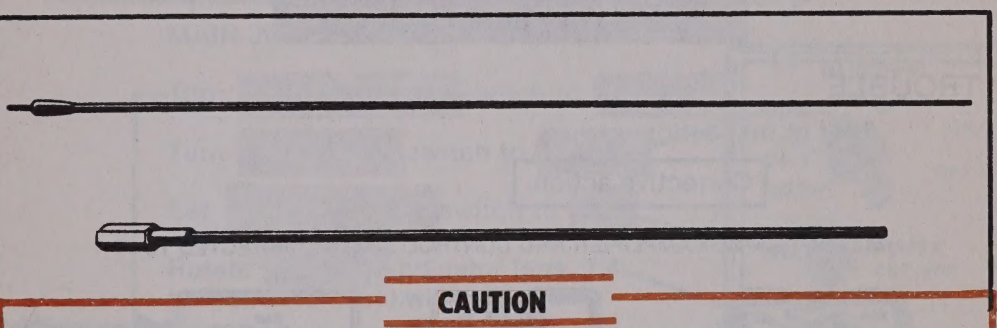
SECTION I.

LUBRICATING INSTRUCTIONS

3-1. **Silicone** compound

Use Silicone Compound (item 3, appx. D)

- Use on antenna sections
- Clean threads before you apply the SILICONE COMPOUND
- Put on male threads only



CAUTION

Do not use graphite grease on the threads.

- Use on O'rings and accessory connectors

(small amount with care)

CAUTION

Make sure no SILICONE COMPOUND gets on the contacts or pins of any receptacle.

Section II. TROUBLESHOOTING PROCEDURES

The TROUBLESHOOTING chart tells you some of the troubles you may encounter during the operation of the radio sets when they are used with an intercom system. You should perform the tests, inspections and corrective actions in the order listed.

This manual cannot cover all the troubles that may occur, nor all tests or inspections and corrective actions. If a trouble is not listed or it cannot be corrected by doing the corrective actions, notify your supervisor.

NOTE: DO NOT TRY TO TROUBLESHOOT THE RADIO AND INTERCOM EQUIPMENT UNTIL YOU HAVE CHECKED WITH C-E ORG MAINTENANCE TO MAKE SURE THAT THE LINKS IN ALL RADIO MOUNTS ARE CONNECTED SO YOU CAN CONTROL POWER TO RADIO AND INTECOM EQUIPMENT AS THIS TM TELLS YOU.

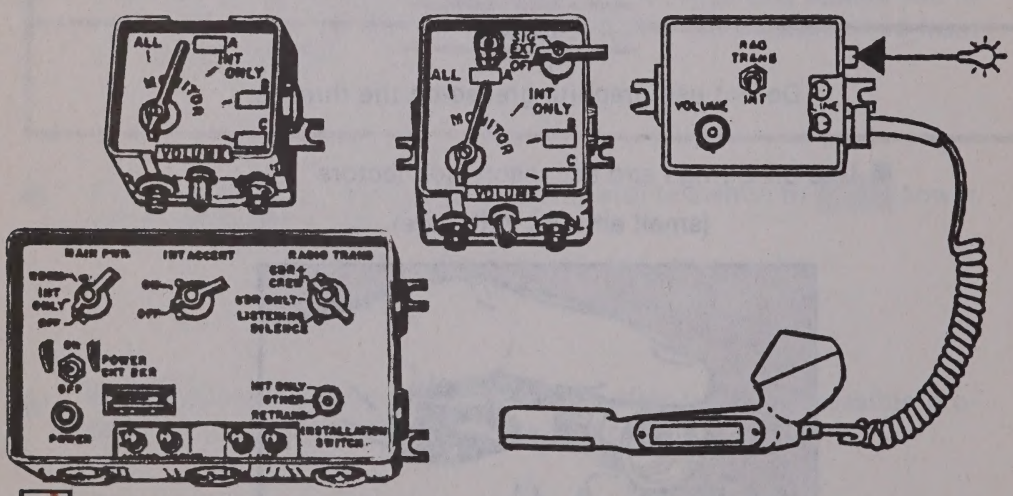
Table 3-1. TROUBLESHOOTING

TROUBLE

Test or Inspection

Corrective action.

MAIN JUNCTION BOX-AMPLIFIER AND CONTROL BOXES CONNECTED TO IT



1. **YOU CANNOT COMMUNICATE ON RADIO OR INTERCOM FROM ANY CONTROL BOX.**

Step 1. Check your cables and their connections.

Trace out the cables in your system and make sure that the cables are properly connected, firmly seated and tightly connected in the receptacles.

NOTE: DON'T FORGET TO CHECK THE MAIN POWER CABLE TO THE INSTALLATION OR VEHICLE MAIN ELECTRICAL POWER SOURCE.

TROUBLESHOOTING - Continued

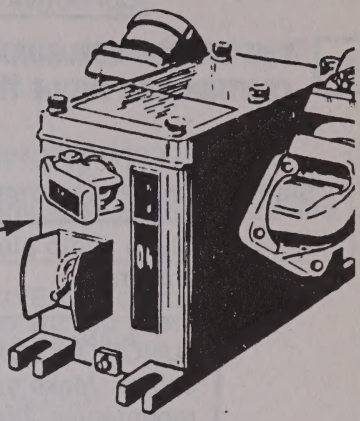
TROUBLE

Test or Inspection

Corrective action.

Step 2. Check to see that power is available to the radio and intercom equipment.

Make the following control adjustments:



SUPPRESSOR (MX-7778B/GRC) (if used).

Set CIRCUIT BREAKER to ON.

Set BATTLE OVERRIDE switch to OFF.

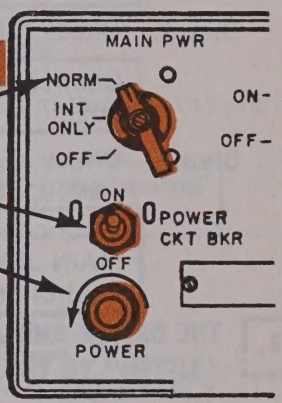
MAIN JUNCTION BOX-AMPLIFIER

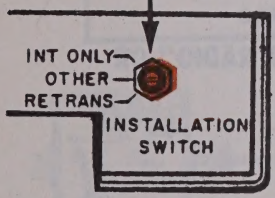
Turn INSTALLATION switch to OTHER.

Turn MAIN PWR switch to NORM.

Set PWR CKT BKR switch to ON.

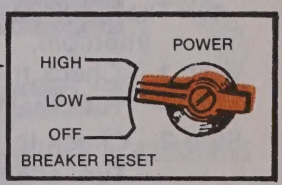
Rotate POWER indicator lens 1/4 turn counter-clockwise.





"A" R-T (the R-T connected to J501 on the MAIN JUNCTION BOX-AMPLIFIER

Turn POWER switch to LOW or HIGH.



NOTE:

This procedure should apply power to the "A" R-T and this R-T should supply power to the MAIN JUNCTION BOX and its POWER indicator lamp and to all the control boxes.

CAUTION

IF THE PWR CKT BKR SWITCH ON THE MAIN JUNCTION BOX FLIPS TO OFF, MOVE IT BACK TO ON, IF THE SWITCH FLIPS BACK TO OFF, **DO NOT RESET IT AGAIN,** CALL ORGANIZATIONAL C-E MAINTENANCE.

TROUBLE

Test or Inspection

Corrective action.

2. YOU CANNOT COMMUNICATE ON RADIO OR INTERCOM FROM ONE CONTROL BOX INSIDE THE VEHICLE.

NOTE:

All other control boxes inside the vehicle are OK.

Step 1. Check you interconnecting and audio accessory cables.

Clean audio plug and jack contacts with a pencil eraser.

Trace out the cable from the control box to the MAIN JUNCTION BOX-AMPLIFIER and the audio accessory cables. Make sure they are connected to the proper receptacles, firmly seated and snug.

Step 2. Check for a defective audio accessory.

Connect a known good audio accessory to the control box.

Step 3. Check out the receptacles on the MAIN JUNCTION BOX-AMPLIFIER.

Disconnect one of the operating control boxes from the MAIN JUNCTION BOX-AMPLIFIER and connect the control box you are troubleshooting in its place.

3. THE DRIVER AND ALL CREWMEMBERS CANNOT "KEY THE RADIO" OR "LISTEN" TO THE RADIO AT THEIR CONTROL BOXES.

NOTE

1. All control boxes work on intercom.

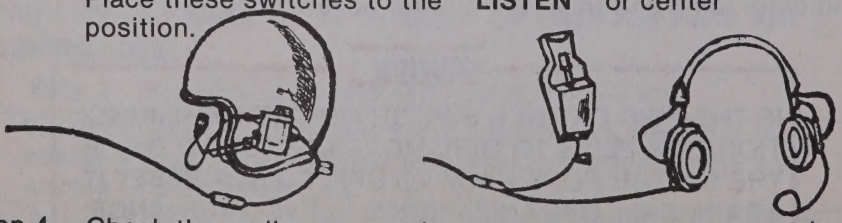
NOTE

2. The COMMANDER'S control box **works** on both radio and intercom.

Step 1. Check the control settings on the MAIN JUNCTION BOX.
Turn the RADIO TRANS switch to **CDR + CREW**

Step 2. Check the control settings on all control boxes.
Turn all MONITOR switches to a good radio position like ALL.

Step 3. Check the switchs on all CVC helmets and all combination earphone-headsets.
Place these switches to the **"LISTEN"** or center position.



Step 4. Check the audio accessories connected to the control boxes.
In turn, substitute a known good accessory.

TROUBLE

Test or Inspection

Corrective action.

4. YOU CANNOT COMMUNICATE BETWEEN THE OUTSIDE CONTROL BOX AND THE COMMANDER AND CREW'S CONTROL BOX.

NOTE: All other control boxes are OK.

Step 1. Check the cable connections between components.

Make sure all connections are properly connected, seated and snug.

Step 2. Check the control settings on the DRIVER'S control box.

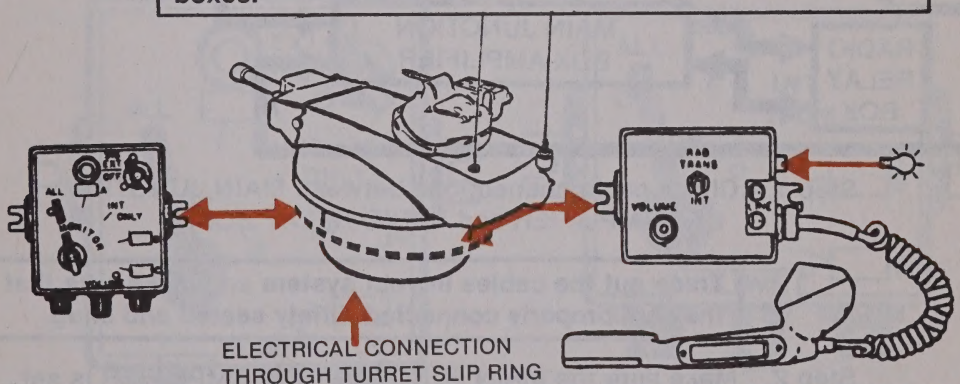
Turn MONITOR switch to a useable position.

NOTE: Position C is not a useable position.
Turn the SIG EXT OFF switch to EXT .

NOTE: The lamp next to the switch should light.

Step 3. Check for a possible poor electrical connection through the slip ring assembly on the turret .

While rotating the turret l/4 turn, try operating the control boxes.



5. THE COMMANDER CANNOT COMMUNICATE WITH HIS AUDIO ACCESSORIES CONNECTED TO THE "CUPOLA AUDIO CONNECTIONS."

NOTE: All other crewmembers have communications.

Step 1. Check the COMMANDER'S audio accessories.

Substitute a known good audio accessory.

Step 2. Check for a poor electrical connection.

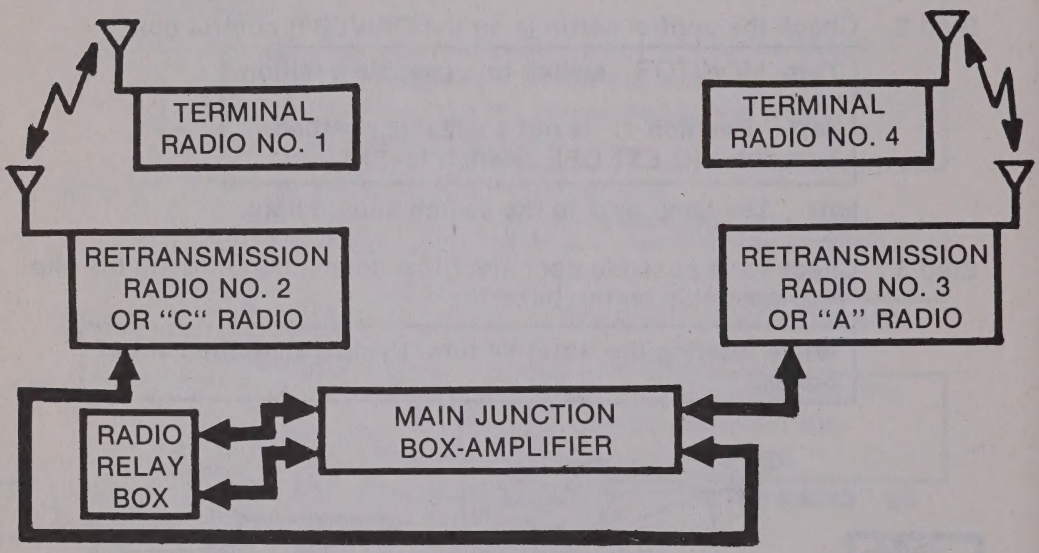
Disconnect the cable from the cupola audio receptacles from the COMMANDER'S control box and connect the COMMANDER'S audio accessories directly to his control box.

TROUBLE	Test or Inspection	Corrective action.

6. AUTOMATIC RADIO RELAY IS NOT POSSIBLE WITH RADIO RELAY BOX (C-2299/VRC) CONNECTED TO THE MAIN JUNCTION BOX.

NOTE:

Each R-T can communicate independently with its terminal station and the RETRANS switch on the RADIO RELAY BOX is set to ON.


TERMINAL RADIO NO. 1
TERMINAL RADIO NO. 4
RETRANSMISSION RADIO NO. 2 OR "C" RADIO
RETRANSMISSION RADIO NO. 3 OR "A" RADIO
RADIO RELAY BOX
MAIN JUNCTION BOX-AMPLIFIER

Step 1. Check cable connections between MAIN JUNCTION BOX-AMPLIFIER and RADIO RELAY BOX.

Trace out the cables in your system and make sure that they are properly connected, firmly seated and snug.

Step 2. Make sure the MAIN JUNCTION BOX-AMPLIFIER is set up for automatic radio relay operation.

Place the INSTALLATION SWITCH to RETRANS.

Step 3. Check the SQUELCH control settings on the R-T's.

Make sure that all R-T's in the relay hook-up have their SQUELCH controls set up in the same SQUELCH mode (NEW ON).

NOTE:

Remember, VINSON COMSEC EQUIPMENT cannot be used in this hookup.

TROUBLESHOOTING - Continued

TROUBLE

Test or Inspection

Corrective action.

7 AT ALL CONTROL BOXES INSIDE THE VEHICLE, YOU CANNOT "KEY THE RADIO" OR "LISTEN" TO THE RADIO.

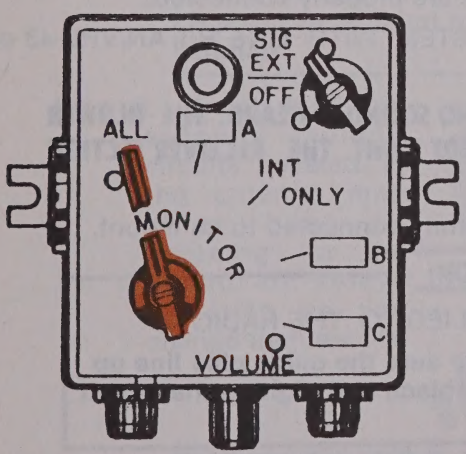
NOTE:
All control boxes can communicate on intercom.

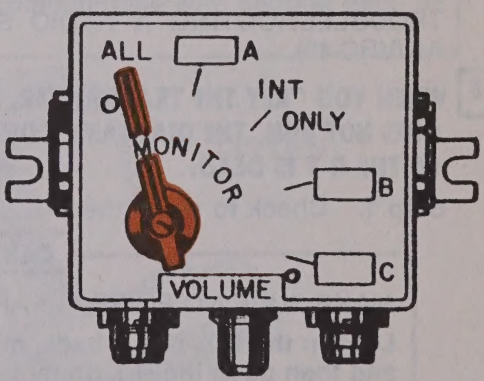
Step 1. Check the control settings on the MAIN JUNCTION BOX.

Turn MAIN PWR switch to NORM
Turn RADIO TRANS switch to CDR + CREW
Turn INSTALLATION switch to OTHER
UNLESS you are hooked-up for radio relay, then set to RETRANS.

Step 2. Check the control settings on the control boxes.

Set all MONITOR switches to a good radio position like ALL.





Step 3. Check your cables and their connections between the MAIN JUNCTION BOX-AMPLIFIER and the RT MOUNTS.

Trace out the cables in your system and make sure that cables are connected to the right receptacle, firmly seated and snugly connected.

Step 4. If the above corrective actions do not clear-up your radio problems, troubleshoot the radio.

Follow the troubleshooting procedures listed on the following pages.

TROUBLE

Test or Inspection

Corrective action.

NOTE

THE PREVIOUS TROUBLESHOOTING STEPS WERE DESIGNED TO HELP YOU CLEAR-UP TROUBLES IN YOUR RADIO AND INTERCOM HOOK UP.

NOW

USE THE FOLLOWING STEPS FOR TROUBLES INVOLVING YOUR RADIOS

BUT

BEFORE TROUBLESHOOTING YOUR RADIOS, **MAKE SURE** THE FOLLOWING ARE DONE:

1. Your intercom checks out OK.
2. A known good audio accessory is connected to the front panel of the radio you are troubleshooting.
3. All cables are connected to the proper receptacles, firmly seated and snug.
4. Your SUPPRESSOR (if one is used) is OK.
5. The controls on your MAIN JUNCTION BOX-AMPLIFIER are set as follows:
   MAIN PWR switch to NORM.
   INSTALLATION SWITCH to OTHER.
6. The links in all radio mounts are properly connected.

TROUBLESHOOTING A RADIO SYSTEM WITH ONE R-T AN/VRC-43 or AN/VRC-46)

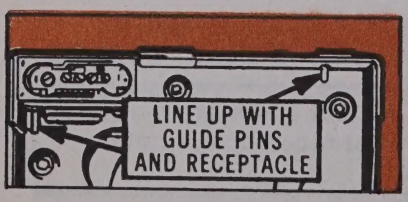
8 **WHEN YOU "KEY THE TRANSMITTER," NO SOUND IS HEARD. THE BLOWER DOES NOT RUN, THE DIAL LAMP DOES NOT LIGHT. THE RECEIVER SECTION OF THE R-T IS DEAD.**

Step 1. Check to see if the R-T is firmly connected to its mount.

CAUTION:

MAKE SURE NO POWER IS APPLIED TO THE RADIO

Loosen the R-T, pull it back, make sure the guide pins line up and then push the R-T firmly into place and tighten the mount to R-T clamps.



Step 2. Check to see if the R-T circuit breakers have been tripped.

Set the R-T POWER **switch to** OFF BREAKER RESET and then back to LOW **or** HIGH.

TROUBLE

Test or Inspection

Corrective action.

9. WHEN YOU "KEY THE RADIO," YOU HEAR SIDETONE BUT THE DISTANT STATION DOES NOT ANSWER. THE RECEIVER SECTION OF THE R-T IS OK WHEN YOU TUNE IN OTHER STATIONS.

Step 1. Check to see that the R-T tuning controls are set to the assigned frequency.

Change the tuning controls to another frequency and then back to the assigned frequency.

Step 2. Make sure you have enough transmitter power to reach the distant station.

Transmit on HIGH power.

Step 3. Attempt communications on an alternate frequency.

If an alternate frequency schedule is made up, switch to the authorized alternate frequency.

Step 4. Check transmitter for normal operation.

If possible, attempt to communicate with another near- by station.

Step 5. Check the whip antenna tuning circuits located in the antenna matching base by listening for the sound of relays operating as you change frequencies.

Manually tune the antenna if possible or switch antennas if authorized.

Step 6. Check to see that both antenna elements are tightly screwed together.

Turn off transmitter and re-tighten antenna sections.

Step 7. Test for best antenna orientation.

If the whip antenna is tied down, untie it and reposition your vehicle in several locations or positions.

TROUBLE

Test or Inspection

Corrective action.

10. WHEN YOUR SQUELCH IS SET TO NEW ON YOU CANNOT RECEIVE THE DISTANT STATION AND YOUR CALL LAMP DOES NOT LIGHT.

Step 1. Verify that the distant station is transmitting with its SQUELCH switch at NEW ON , NEW OFF , or OLD OFF .

Set your SQUELCH switch to NEW OFF and communicate with the distant station telling him to place his SQUELCH to NEW ON .

Step 2. Verify that the distant station is too far away for SQUELCH operation.

Communicate with the distant station with you SQUELCH switch set to NEW OFF .

11. WHEN YOU PRESS A PUSHBUTTON ON YOUR R-T, YOU CANNOT HEAR THE AUTOMATIC TUNER INSIDE THE R-T OPERATE AND THE DIAL NUMBERS DO NOT CHANGE.

NOTE:

This applies to RT-246(*)/VRC only.

Step 1. Check the position of the BAND switch on your R-T.

Tune the BAND switch to AUTO .

Step 2. Check out this pushbutton to see if it is bad.

Select another pushbutton and press it.

Step 3. Check to see if all the pushbuttons are bad.

Tune the R-T manually with the MC and KC controls.

12. COMMUNICATIONS CANNOT BE ESTABLISHED WITH THE DISTANT STATION WHEN YOU ARE USING THE REMOTE CONTROL BOX (C-2742/ VRC) TO CONTROL YOUR R-T.

NOTE:

This applies to RT-246(*)/VRC with its pushbuttons properly set-up.

Step 1. Verify that your R-T is capable of operating independently.

Return control to the R-T by replacing the R-T POWER switch LOW or HIGH and the BAND switch to either A or B and check out R-T operation without the REMOTE CONTROL BOX.

Step 2. Check to see that the REMOTE CONTROL BOX operates properly to take control of the R-T, (with R-T POWER switch set at REMOTE).

Momentarily press the toggle SW on the REMOTE CONTROL BOX and see if the CONTROL indicator lights up.

TROUBLESHOOTING - Continued

TROUBLE	Test or Inspection	Corrective action.

TROUBLESHOOTING A RADIO SYSTEM WITH ONE R-T AND ONE AUX RECEIVER (AN/VRC-12 OR AN/VRC-47)

13 **R-T IS OK. AUX RECEIVER DIAL LAMP DOES NOT LIGHT. AUX RECEIVER IS DEAD.**

Step 1. Check to see if the AUX receiver is firmly connected to its mount.

CAUTION:

MAKE SURE NO POWER IS APPLIED TO THE RADIO

Loosen the AUX receiver, pull it back, make sure the guide pins line up and then push the AUX receiver firmly into place and tighten the mount to AUX receiver clamps.

Step 2. Check to see if the AUX receiver circuit breakers have been tripped.

Set the AUX receiver POWER switch to OFF and then back to ON RESET.

14 **R-T IS OK. AUX RECEIVER DIAL LIGHT GLOWS. NO SOUND IS HEARD ON THE AUX RECEIVER.**

Step 1. Check to a defective AUX receiver front panel audio receptacle.

Connect your known good audio accessory to the other AUX receiver front panel audio receptacle.

15 **R-T IS OK. AUX RECEIVER DIAL LIGHT GLOWS AND RUSHING SOUND IS HEARD. REPLY FROM DISTANT STATION CANNOT BE HEARD ON THE AUX RECEIVER.**

Step 1. Check to see that the AUX receiver tuning controls are accurately tuning to the frequency indicated by the dial numbers.

If possible, attempt to receiver a signal from another transmitter operating on a different frequency and then retune the AUX receiver to the assigned frequency.

Step 2. Check for best AUX receiver antenna orientation.

If the AUX receiver antenna is tied down, untie it and reposition your vehicle in several locations and positions. Follow troubleshooting instruction 10.

16 **AUX RECEIVER IS OK. R-T DOES NOT OPERATE PROPERLY OR IS COMPLETELY DEAD.**

Step 1. Troubleshoot the R-T.

Follow troubleshooting instructions 9, 10, 11, 12 and 13.

TROUBLE	Test or Inspection	Corrective action.

TROUBLESHOOTING A RADIO SYSTEM WITH ONE R-T AND TWO AUX RECEIVERS AN/VRC-44 OR AN/VRC-48)

17. R-T IS INOPERATIVE. BOTH AUX RECEIVERS WORK.

Step 1. Troubleshoot the R-T.

Follow troubleshooting instructions 9, 10, 11, 12, and 13.

18. R-T IS OK BUT BOTH AUX RECEIVERS ARE INOPERATIVE.

Step 1. Troubleshoot each AUX receiver.

Follow troubleshooting instructions 14, 15 and 16.

19. ONE AUX RECEIVER IS INOPERATIVE. THE OTHER AUX RECEIVER AND THE R-T ARE OK.

Step 1. Verify that the mount for the inoperative receiver is OK.

Remove the good AUX receiver from its mount and replace it with the AUX receiver you are trouble-shooting.

Step 2. Troubleshoot the AUX receiver.

Follow troubleshooting instructions 14, 15 and 16.

TROUBLESHOOTING A RADIO SYSTEM WITH TWO R-T'S (AN/VRC-45 OR AN/VRC-49)

20. ONE R-T IS INOPERATIVE, THE OTHER R-T IS OK.

Step 1. Verify that the mount for the inoperative R-T is OK.

Remove the good R-T from its mount and substitute the R-T you are troubleshooting.

Step 2. Troubleshoot the R-T.

Follow troubleshooting instructions 9, 10, 11, 12 and 13.

21. BOTH R-T'S ARE INOPERATIVE.

Step 1. Troubleshoot each R-T.

Follow troubleshooting instructions 9, 10, 11, 12 and 13..

APPENDIX A
REFERENCE

The following is a list of applicable references that are available to the operator of AN/VRC-12 series radios.

DA Pam 310-1	Consolidated Index of Army Publications and Blank Forms.
SB 11-131	Vehicular radio sets and authorized installations.
SB 11-624	Warning notice for vehicles in which radios are mounted.
SB 11-638	Application, Installing, Maintenance and Testing of Suppressor, Electrical Transient (NSN 5915-01-024-3877).
TB 43-0118	Field Instructions for Painting and Preserving Electronics Command Equipment, Including Camouflage Pattern Painting of Electrical Equipment Shelters.
TM 11-5810-256-OP-1	Net Controller Operating Procedures for Communications Security Equipment TSEC/KY-57.
TM 11-5810-256-OP-4	Operating Procedures for Communications Security Equipment TSEC/KY-57 in Tracked Vehicles.
TM 11-5810-256-12	Operator's and Organizational Maintenance for Communications Security Equipment TSEC/KE-57.
TM 11-5810-290-14&P	Operator's and Organizational, Direct Support and General Support Maintenance Manual for Installation Kits, Electronic Equipment Used With Communications Security Equipment TSEC/KY-38 and HYL-3/TSEC.
TM 11-5810-300-12	Operator's and Organizational Maintenance Manual for NESTOR Communications Systems Using TSEC/KY-8 and TSEC/KY-38 with Radio Sets and Associated Equipment.

APPENDIX A (Continued)

TM 11-5810-312-12	Operator's and Organizational Maintenance Manual: Installation Kits for communications Security Equipment TSEC/KY-57.
TM 11-5820-348-15	Organizational, Direct Support, General Support, and Depot Maintenance Manual: Antenna Equipment RC-292 (NSN 5985-00-497-8554).
TM 11-5820-401-10-1	Operator's Manual: Radio Sets AN/VRC-12 (NSN 5820-00-223-7412), AN/VRC-43 (5820-00-223-7415), AN/VRC-44 (5820-00-223-7417), AN/VRC-45 (5820-00-223-7418), AN/VRC-46 (5820-00-223-7433), AN/VRC-47 (5820-00-223-7434), AN/VRC-48 (5820-00-223-7435), and AN/VRC-49 (5820-00-223-7437) (used without an intercom system).
TM 11-5820-401-10-2-HR	Hand Receipt Technical Manual Covering End Item/Components of End Item (COEI). Basic Issue Items, and Additional Authorization List (AAL) for Radio Sets AN/VRC-12 (NSN 5820-00-223-7412), AN/VRC-43 (5820-00-223-7415), AN/VRC-44 (5820-00-223-7417),AN/VRC-45 (5820-00-223-7418),AN/VRC-46 (5820-00-223-7433),AN/VRC-47 (5820-00-223-7434),AN/VRC-48 (5820-00-223-7435),and AN/VRC-49 (5820-00-223-7437) (used with Intercom System).
TM 11-5820-401-12	Operator's and Organizational Maintenance Manual for: Radio Set AN/VRC-12(NSN 5820-00-223-7412), AN/VRC-43 (5820-00-223-7415), AN/VRC-44 (5820-00-223-7417), AN/VRC-45 (5820-00-223-7418), AN/VRC-46 (5820-00-223-7433), AN/VRC-47 (5820-00-223-7434), AN/VRC-48 (5820-00-223-7435), AN/VRC-49 (5820-00-223-7437), AN/VRC-54 (5820-00-223-7567), MOUNTING MT-1029/VRC (5820-00-893-1323) and MT-1898/VRC (5820-00-893-1324); Antenna AT-912/VRC (5820-00-897-6357); Control, Frequency Selector C-2742/VRC (5820-892-3343), and Control Radio set C-2299/VRC (5820-00-892-3340).

APPENDIX A (Continued)

TM 11-5830-340-12	Operator's and Organizational Maintenance Manual (Including Repair Parts and Special Tools Lists): Intercommunications Set AN/VIC-1(V). Controls Intercommunications Set, C-10456/VRC (NSN 5830-01-082-0804), C-10680/VRC and Amplifier, Audio Frequency, AM-7046/VRC.
TM 11-5915-223-12	Operator's and Organizational Maintenance Manual: Suppressor, Electrical Transient MX-7778/GRC (NSN 5915-00-937-9564).
TM 11-5915-224-14	Operator's, Organizational, Direct Support and General Support Maintenance Manual: Suppressor, Electrical Transient MX-7778A/GRC (NSN 5915-00-413-6718).
TM 11-5965-280-15	Operator, Organizational, Direct Support, General Support, and Depot Maintenance Manual (Including Repair Parts and Special Tools List): Handset H-189/GR (NSN 5965-00-069-8886).
TM 11-5985-262-15	Operator's, Organizational, Direct Support, General Support, and Depot Maintenance Manual: Antenna AS-1729/VRC (NSN 5985-00-985-9024).
TM 11-5985-355-13	Operator's, Organizational, and Direct Support Maintenance Manual: Antenna AS-2731/GRC (NSN 5985-01-017-0785).
TM 11-5985-357-13	Operator's, Organizational and Direct Support Maintenance Manual for Antenna Group OE-254/GRC (NSN 5985-01-063-1574).
TM 38-750	The Army Maintenance Management System (TAMMS).
TM 750-244-2	Procedures for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command).

APPENDIX B
COMPONENTS OF END ITEM LIST

Section I. INTRODUCTION

B-1. Scope

This appendix lists integral components of and basic issue items for the Radio Sets AN/VRC-12 and AN/VRC-43 through AN/VRC-49 to help you inventory items required for safe and efficient operation.

B-2. General

This Components of End Item List is divided into the following sections:

a. Section II. Integral Components of the End Item.

These items, when assembled, comprise the Radio Sets AN/VRC-12 and AN/VRC-43 through AN/VRC-49 and must accompany them whenever they are transferred or turned in. The illustration will help you identify these items.

b. Section III. Basic Issue Items. Not applicable.

B-3. Explanation of Columns

a. Illustration. This column is divided as follows:

(1) Figure number. Indicates the figure number of the illustration on which the item is shown.

(2) Item number. The number used to identify item called out in the illustration.

b. National Stock Number. Indicates the National stock number assigned to the item and which will be used for requisitioning.

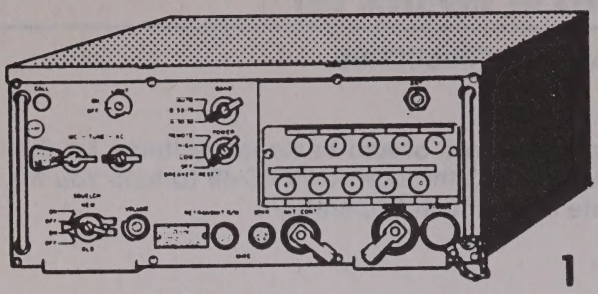
c. Description. Indicates the Federal item name and, if required a minimum description to identify the item. The part number indicates the primary number used by the manufacturer, which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items. Following the part number, the Federal Supply Code for Manufacturers (FSCM) is shown in parentheses.

d. Location. The physical location of each item listed is given in this column. The lists are designed to inventory all items in one area of the major item before moving on to an adjacent area.

e. Usable on Code. Not applicable.

f. Quantity Required (Qty Reqd). This column lists the quantity of each item required for a complete major item.

g. Quantity. This column is left blank for use during an inventory. Under the Rcvd column, list the quantity you actually receive on your major item. The Date columns are for your use when you inventory the major item.



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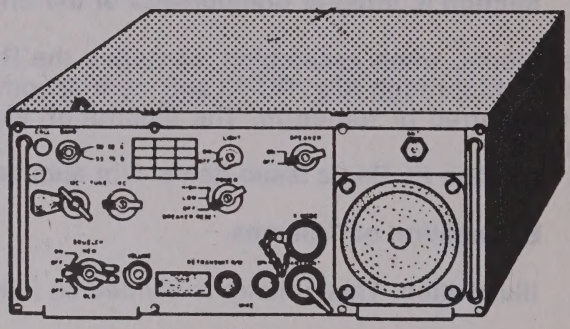

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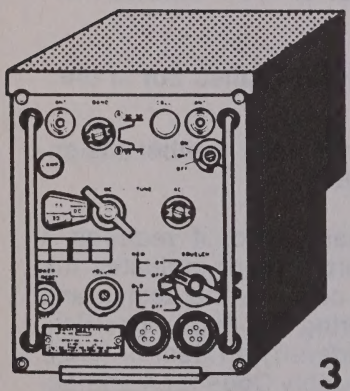

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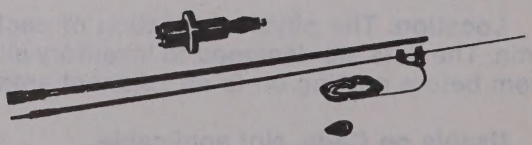

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FIGURE B-1

SECTION II INTEGRAL COMPONENTS OF END ITEM

(1) ILLUSTRATION (A) FIG NO.	(1) ILLUSTRATION (B) ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION PART NUMBER	(3) DESCRIPTION (FSCM)	(4) LOCATION	(5) US — ABLE ON CODE	(6) QTY REQD	(7) QUANTITY RCVD	(7) QUANTITY DATE
			TM 11-5820-401-10-2						
		5820-00-223-7412	RADIO SET AN/VRC-12						
B-1	1	5820-00-892-0623	RECEIVER-TRANSMITTER, RADIO RT-246/VRC or RT-246A/VRC	(80063)			1		
B-1	3	5820-00-892-0624	RECEIVER-RADIO R-442/VRC or R-442A/VRC	(80063)			1		
B-1	4	5985-00-985-9024	ANTENNA AS-1729/VRC	(80063)			1		
		5820-00-223-7415	RADIO SET AN/VRC-43						
B-1	1	5820-00-892-0623	RECEIVER-TRANSMITTER, RADIO RT-246/VRC or RT-246A/VRC	(80063)			1		
B-1	4	5985-00-985-9024	ANTENNA AS-1729/VRC	(80063)			1		
B-1		5820-00-223-7417	RADIO SET AN/VRC-44						
	1	5820-00-892-0623	RECEIVER-TRANSMITTER, RADIO RT-246/VRC or RT-246A/VRC	(80063)			1		
B-1	3	5820-00-892-0624	RECEIVER, RADIO R-442/VRC or R-442A/VRC	(80063)			2		
B-1	4	5985-00-984-9024	ANTENNA AS-1729/VRC	(80063)			1		
		5820-00-223-7418	RADIO SET AN/VRC-45						
B-1	1	5820-00-892-0623	RECEIVER-TRANSMITTER, RADIO RT-246/VRC or RT-246A/VRC	(80063)			2		

SECTION II INTEGRAL COMPONENTS OF END ITEM

(1) ILLUSTRATION (A) FIG NO.	(1) ILLUSTRATION (B) ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION PART NUMBER	(3) DESCRIPTION (FSCM)	(4) LOCATION	(5) USABLE ON CODE	(6) QTY REQD	(7) QUANTITY RCVD	(7) QUANTITY DATE
B-1	4	5985-00-985-9024	ANTENNA AS-1729/VRC	(80063)			2		
		5820-00-223-7433	RADIO SET AN/VRC-46						
B-1	2	5820-00-892-0622	RECEIVER-TRANSMITTER, RADIO RT-524/VRC or RT-524A/VRC	(80063)			1		
B-1	4	5985-00-985-9024	ANTENNA AS-1729/VRC	(80063)			1		
		5820-00-223-7434	RADIO SET AN/VRC-47						
B-1	2	5820-00-892-0622	RECEIVER-TRANSMITTER, RADIO RT-524/VRC or RT-524A/VRC	(80063)			1		
B-1	3	5820-00-892-0624	RECEIVER, RADIO R-442/VRC or R-442A/VRC	(80063)			1		
B-1	4	5985-00-985-9024	ANTENNA AS-1729/VRC	(80063)			1		
		5820-00-223-7435	RADIO SET AN/VRC-48						
B-1		5820-00-892-0622	RECEIVER-TRANSMITTER, RADIO RT-524/VRC or RT-524A/VRC	(80063)			1		
B-1	3	5820-00-892-0624	RECEIVER, RADIO R-442/VRC or R-442A/VRC	(80063)			2		
B-1	4	5895-00-985-9024	ANTENNA AS-1729/VRC	(80063)			1		
		5820-00-223-7437	RADIO SET AN/VRC-49						
B-1	2	5820-00-892-0622	RECEIVER-TRANSMITTER, RADIO RT-524/VRC or RT-524A/VRC	(80063)			2		
B-1	4	5985-00-985-9024	ANTENNA AS-1729/VRC	(80063)			2		

APPENDIX C
ADDITIONAL AUTHORIZATION LIST

Section I. INTRODUCTION

C-1. Scope

This appendix lists additional items you are authorized for the support of Radio Sets AN/VRC-12 and AN/VRC-43 through AN/VRC-49.

C-2. General

This list identifies items that do not have to accompany the Radio Sets AN/VRC-12 and AN/VRC-43 through AN/VRC-49 and that do not have to be turned in with it. These items are all authorized to you by CTGA, MTOE, TDA, or JTA.

C-3. Explanation of listing.

National stock numbers, description, and quantities are provided to help you identify and request the additional items you require to support this equipment. The items are listed in alphabetical sequence by item name under the type document (i.e., CTA, MTOE, TDA, or JTA) which authorize the item(s) to you.

SECTION II ADDITIONAL AUTHORIZATIONAL LIST

NATIONAL STOCK NUMBER	DESCRIPTION	QTY
	RADIO SET USED IN LARC 5	
	AN/VRC-46:	
5820-00-492-8261	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-493-7515	MX-1283/GRC ACCESSORY KIT (FOR RADIO)	1
	RADIO SET USED IN LARC 15	
	AN/VRC-46:	
5820-00-492-8265	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-493-7516	MK-1284/V ACCESSORY KIT (FOR RADIO)	1
	RADIO SET USED IN LARC 60	
	AN/VRC-46:	
5820-00-492-8273	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-493-7521	MK-1286/V ACCESSORY KIT (FOR RADIO)	1
	RADIO SET USED IN M42	
	AN/VRC-46:	
5820-00-494-6631	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-494-6651	MK-1276/G ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-486-7875	INSTALLATION KIT FOR MX-7778A/GRC	1
	RADIO SETS USED IN M48A2	
	AN/VRC-12:	
5820-00-494-6641	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-493-7537	MK-1263/V ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1

SECTION II ADDITIONAL AUTHORIZATIONAL LIST

NATIONAL STOCK NUMBER	DESCRIPTION	QTY
5820-00-412-1717	INSTALLATION KIT FOR MX-7778A/GRC	1
	AN/VRC-46:	
5820-00-762-4870	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-493-7542	MK-1264/V ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MK-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-1717	INSTALLATION KIT FOR MX-7778A/GRC	1
	AN/VRC-47:	
5820-00-726-4866	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-493-7537	MK-1263/V ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MK-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-1717	INSTALLATION KIT FOR MK-7778A/GRC	1
	RADIO SETS USED IN M48A3	
	AN/VRC-12:	
5820-00-494-6620	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-493-7537	MK-1263/V ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-1717	INSTALLATION KIT FOR MX-7778A/GRC	1
	AN/VRC-46:	
5820-00-494-6618	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-493-7542	MK-1264/V ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-1717	INSTALLATION KIT FOR MX-7778A/GRC	1
	AN/VRC-47:	
5820-00-493-3040	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-493-7537	MK-1263/V ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-1717	INSTALLATION KIT FOR MX-7778A/GRC	1

SECTION II ADDITIONAL AUTHORIZATIONAL LIST

NATIONAL STOCK NUMBER	DESCRIPTION	QTY
	RADIO SETS USED IN M48A5	
	AN/VRC-12:	
5820-01-057-5746	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-493-7537	MK-1263/V ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-1717	INSTALLATION KIT FOR MX-7778A/GRC	1
	AN/VRC-46:	
5820-01-057-5745	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-493-7542	MK-1264/V ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-1717	INSTALLATION KIT FOR MX-7778A/GRC	1
	AN/VRC-47:	
5820-01-057-5747	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-493-7537	MK-1263/V ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-1717	INSTALLATION KIT FOR MX-7778A/GRC	1
	RADIO SETS USED IN M56	
	AN/VRC-12:	
5820-00-493-7509	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-938-0239	MK-1315/VRC-12 ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-763-2062	INSTALLATION KIT FOR MX-7778A/GRC	1

SECTION II ADDITIONAL AUTHORIZATIONAL LIST

NATIONAL STOCK NUMBER	DESCRIPTION	QTY
	AN/VRC-46:	
5820-00-493-7512	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-191-7382	MK-1317/GRC ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-763-2062	INSTALLATION KIT FOR MX-7778A/GRC	1
	RADIO SETS USED IN M60	
	AN/VRC-12:	
5820-00-493-3026	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-938-0247	MK-1303/V ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-1974	INSTALLATION KIT FOR MX-7778A/GRC	1
	AN/VRC-46:	
5820-00-493-3035	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-938-0248	MK-1302/G ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-1974	INSTALLATION KIT FOR MX-7778A/GRC	1
	AN/VRC-47:	
5820-00-493-3037	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-938-0247	MK-1303/V ACCESSORY KIT (FOR RADIO)	1
5820-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-1974	INSTALLATION KIT FOR MX-7778A/GRC	1
	RADIO SETS USED IN M60A1	
	AN/VRC-12:	
5820-00-494-6625	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	

SECTION II ADDITIONAL AUTHORIZATIONAL LIST

NATIONAL STOCK NUMBER	DESCRIPTION	QTY
5820-00-938-0247	MK-1303/V ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-1974	INSTALLATION KIT FOR MX-7778A/VRC	1
	AN/VRC-46:	
5820-00-494-6624	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-938-0248	MK-1302/V ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-1974	INSTALLATION KIT FOR MX-7778A/GRC	1
	AN/VRC-47:	
5820-00-494-6627	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-938-0247	MK-1303/V ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-1974	INSTALLATION KIT FOR MX-7773A/GRC	1
	RADIO SETS USED IN M60A2	
	AN/VRC-12:	
5820-00-493-7494	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-494-6648	MK-1294/V ACCESSORY KIT (FOR RADIO)	1
5915-01-024-3877	SUPPRESSOR, ELECTRICAL TRANSIENT (MINI-SUPPRESSOR) (ON MT-1029/VRC)	1
	AN/VRC-46:	
5820-00-494-6636	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-494-6642	MK-1287/G ACCESSORY KIT (FOR RADIO)	1
5915-00-024-3877	SUPPRESSOR, ELECTRICAL TRANSIENT (MINI-SUPPRESSOR) (IN MT-1029/VRC)	1

SECTION II ADDITIONAL AUTHORIZATIONAL LIST

NATIONAL STOCK NUMBER	DESCRIPTION	QTY
	AN/VRC-47:	
5820-00-493-7493	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-494-6648	MK-1294/V ACCESSORY KIT (FOR RADIO)	1
5915-01-024-3877	SUPPRESSOR, ELECTRICAL TRANSIENT (MINI-SUPPRESSOR) (ON MT-1029/VRC)	1
	RADIO SETS USED IN M60A3 AND M60A1	
	AN/VRC-12:	
5820-01-050-6013	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-938-0247	MK-1303/V ACCESSORY KIT (FOR RADIO)	1
5915-01-024-3877	SUPPRESSOR, ELECTRICAL TRANSIENT (MINI-SUPPRESSOR) (ON MT-1029/VRC)	1
	AN/VRC-46:	
5820-01-050-6017	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-938-0248	MK-1302/V ACCESSORY KIT (FOR RADIO)	1
5915-01-024-3877	SUPPRESSOR, ELECTRICAL TRANSIENT (MINI-SUPPRESSOR) (ON MT-1029/VRC)	1
	AN/VRC-47:	
5820-01-050-6019	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-938-0247	MK-1303/V ACCESSORY KIT (FOR RADIO)	1
5915-01-024-3877	SUPPRESSOR, ELECTRICAL TRANSIENT (MINI-SUPPRESSOR) (ON MT-1029/VRC)	1
	RADIO SETS USED IN AVLB (M48 OR M60)	
	AN/VRC-46:	
5820-00-494-6639	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	

SECTION II ADDITIONAL AUTHORIZATIONAL LIST

NATIONAL STOCK NUMBER	DESCRIPTION	QTY
5820-00-938-0214	MK-1297/G ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-1717	INSTALLATION KIT FOR MX-7778A/GRC in M48 HULL	1
	AN/VRC-46:	
5820-00-494-6636	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-938-0282	MK-1277/V ACCESSORY KIT (FOR RADIO)	1
5815-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-024-5055	INSTALLATION KIT FOR MX-7778A/GRC	1
	RADIO SET USED IN MOBILE FLOAT, ASSAULT BDG/FERRY	
	AN/VRC-46:	
5820-00-492-8261	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-493-7548	MK-1269/G ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESOR, ELECTRICAL TRANSIENT	1
	RADIO SETS USED IN M76	
	AN/VRC-12:	
5820-00-493-7506	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-938-0211	MK-1300/V ACCESSORY KIT (FOR RADIO)	1
	AN/VRC-47:	
5820-00-493-7508	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-938-0211	MK-1300/V ACCESSORY KIT (FOR RADIO)	1

SECTION II ADDITIONAL AUTHORIZATIONAL LIST

NATIONAL STOCK NUMBER	DESCRIPTION	QTY
	RADIO SETS USED IN M88	
	AN/VRC-43:	
5820-00-762-4856	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-493-7535	MK-1259/G ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-1874	INSTALLATION KIT FOR MX-7778A/GRC	1
	AN/VRC-46:	
5820-00-762-4856	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-493-7535	MK-1259/G ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-1874	INSTALLATION KIT FOR MX-7778A/GRC	1
	RADIO SET USED IN M106 AND M125	
	AN/VRC-46:	
5820-00-493-7490	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICL	
5820-00-494-6646	MK-1291/G ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-013-3949	INSTALLATION KIT FOR MX-7778A/GRC	1
	RADIO SETS USED IN M113, A1	
	AN/VRC-12:	
5820-00-762-4863	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-493-7546	MK-1266/V ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-486-7285	INSTALLATION KIT FOR MX-7778A/GRC	1
5820-01-052-8969	SUPPLEMENT KIT: 3d C-2298/VRC IN T-O-W MISSILE (TARGET ON WIRE) CONFIGURATION	1

SECTION II ADDITIONAL AUTHORIZATIONAL LIST

NATIONAL STOCK NUMBER	DESCRIPTION	QTY
	AN/VRC-43:	
5820-00-762-4851	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-493-7545	MK-1265/G ACCESSORY KIT (FOR RADIO)	1
5820-00-492-6096	MK-1262/VIC-1(V) ACCESSORY KIT (FOR INTERCOM)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-486-7285	INSTALLATION KIT FOR MX-7778A/GRC	1
5820-01-052-8969	SUPPLEMENT KIT: 3d C-2298/VRC IN T-O-W MISSILE (TARGET ON WIRE) CONFIGURATION	1
	AN/VRC-44:	
5820-00-762-4852	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-938-0283	MK-1267/V ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-486-7285	INSTALLATION KIT FOR MX-7778A/GRC	1
5820-01-052-8969	SUPPLEMENT KIT: 3d C-2298/VRC IN T-O-W MISSILE (TARGET ON WIRE) CONFIGURATION	1
	AN/VRC-45:	
5820-00-762-4854	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-493-7547	MK-1268/V ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-486-7285	INSTALLATION KIT FOR MX-7778A/GRC	1
5820-01-052-8969	SUPPLEMENT KIT: 3d C-2298/VRC IN T-O-W MISSILE (TARGET ON WIRE) CONFIGURATION	1
	AN/VRC-46:	
5820-00-762-4863	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-493-7545	MK-1265/V ACCESSORY KIT (FOR RADIO)	1

SECTION II ADDITIONAL AUTHORIZATIONAL LIST

NATIONAL STOCK NUMBER	DESCRIPTION	QTY
5820-00-492-6096	MK-1262/VIC-1(V) ACCESSORY KIT (FOR AN/VIC-1)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-486-7285	INSTALLATION KIT FOR MX-7778A/GRC	1
5820-01-052-8969	SUPPLEMENT KIT: 3d C-2298/VRC IN T-O-W MISSILE (TARGET ON WIRE) CONFIGURATION	1
	AN/VRC-46:	
5820-00-762-4851	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-493-7545	MK-1265/V ACCESSORY KIT (FOR RADIO)	1
5820-00-492-6096	MK-1262/VIC-1(V) ACCESSORY KIT (FOR AN/VIC-1)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR ELECTRICAL TRANSIENT	1
5820-00-486-7285	INSTALLATION KIT FOR MX-7778A/GRC	1
5820-01-052-8969	SUPPLEMENT KIT: 3d C-2298/VRC IN T-O-W MISSILE (TARGET ON WIRE) CONFIGURATION	1
	AN/VRC-47:	
5820-00-762-4853	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-493-7546	MK-1266/V ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-486-7285	INSTALLATION KIT FOR MX-7778A/GRC	1
5820-01-052-8969	SUPPLEMENT KIT: 3d C-2298/VRC IN T-O-W MISSILE (TARGET ON WIRE) CONFIGURATION	1
	AN/VRC-48:	
5820-00-762-4852	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-938-0283	MK-1267/V ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-486-7285	INSTALLATION KIT FOR MX-7778A/GRC	1

SECTION II ADDITIONAL AUTHORIZATIONAL LIST

NATIONAL STOCK NUMBER	DESCRIPTION	QTY
5820-01-052-8969	SUPPLEMENT KIT: 3d C-2298/VRC IN T-O-W MISSILE (TARGET ON WIRE) CONFIGURATION	1
	AN/VRC-49:	
5820-00-762-4854	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-493-7547	MK-1268/V ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-486-7285	INSTALLATION KIT FOR MX-7778A/GRC	1
5820-01-052-8969	SUPPLEMENT KIT: 3d C-2298/VRC IN T-O-W MISSILE (TARGET ON WIRE) CONFIGURATION	1
	RADIO SETS USED IN M114A1	
	AN/VRC-12:	
5820-00-492-8267	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-493-7549	MK-1280/V ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-001-1379	INSTALLATION KIT FOR MX-7778A/GRC	1
	AN/VRC-43:	
5820-00-492-8266	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-493-7551	MK-1273/G ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-001-1379	INSTALLATION KIT FOR MX-7778A/GRC	1
	AN/VRC-45:	
5820-00-492-8269	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-493-7550	MK-1272/V ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MK-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1

SECTION II ADDITIONAL AUTHORIZATIONAL LIST

NATIONAL STOCK NUMBER	DESCRIPTION	QTY
5820-00-001-1379	INSTALLATION KIT FOR MX-7778A/GRC	1
	AN/VRC-46:	
5820-00-492-8266	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-493-7551	MK-1273/G ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-001-1379	INSTALLATION KIT FOR MX-7778A/GRC	1
	AN/VRC-47:	
5820-00-492-8267	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-493-7549	MK-1270/V ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-001-1379	INSTALLATION KIT FOR MX-7778A/GRC	1
	AN/VRC-49:	
5820-00-492-8269	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-493-7550	MK-1273/V ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-001-1379	INSTALLATION KIT FOR MX-7778A/GRC	1
	RADIO SETS USED IN M116	
	AN/VRC-12:	
5820-00-402-2254	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-401-9646	MK-1413/VRC ACCESSORY KIT (FOR RADIO)	1
5830-00-194-2793	INSTALLATION HARNESS (FOR INTERCOM: P/O VEHICLE)	
5830-00-350-4136	MK-1414/VIC-1(V) ACCESSORY KIT (FOR INTERCOM)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-1996	INSTALLATION KIT FOR MX-7778A/GRC	1

SECTION II ADDITIONAL AUTHORIZATIONAL LIST

NATIONAL STOCK NUMBER	DESCRIPTION	QTY
	AN/VRC-43:	
5820-00-493-7505	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-938-0246	MK-1304/GRC ACCESSORY KIT (FOR RADIO)	1
5830-00-194-2793	INSTALLATION HARNESS (FOR INTERCOM; P/O VEHICLE)	1
5830-00-350-4136	MK-1414/VIC-1(V) ACCESSORY KIT (FOR INTERCOM)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-1996	INSTALLATION KIT FOR MX-7778A/GRC	1
	AN/VRC-46:	
5820-00-493-7505	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-938-0246	MK-1304/GRC ACCESSORY KIT (FOR RADIO)	1
5830-00-194-2793	INSTALLATION HARNESS (FOR INTERCOM; P/O VEHICLE)	1
5830-00-350-4136	MK-1414/VIC-1(V) ACCESSORY KIT (FOR INTERCOM)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-1996	INSTALLATION KIT FOR MX-7778A/GRC	1
	AN/VRC-47:	
5820-00-402-2254	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-401-9646	MK-1413/VRC ACCESSORY KIT (FOR RADIO)	1
5830-00-194-2793	INSTALLATION HARNESS (FOR INTERCOM; P/O VEHICLE)	
5830-00-350-4136	MK-1414/VIC-1(V) ACCESSORY KIT (FOR INTERCOM)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-1996	INSTALLATION KIT FOR MX-7778A/GRC	1
	AN/VRC-49:	
5820-00-402-2259	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-351-3018	MK-1403/VRC ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1

SECTION II ADDITIONAL AUTHORIZATIONAL LIST

NATIONAL STOCK NUMBER	DESCRIPTION	QTY
5820-00-412-1996	INSTALLATION KIT FOR MX-7778A/GRC	1
	RADIO SETS USED IN M132, A1	
	AN/VRC-12:	
5820-00-492-8272	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-938-0219	MK-1324/V ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-1790	INSTALLATION KIT FOR MX-7778A/GRC	1
	AN/VRC-43:	
5820-00-492-8271	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-938-0220	MK-1325/G ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6717	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-1790	INSTALLATION KIT FOR MX-7778A/GRC	1
	AN/VRC-46:	
5820-00-492-8271	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-938-0220	MK-1325/G ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-1790	INSTALLATION KIT FOR MX-7778A/GRC	1
	AN/VRC-47:	
5820-00-492-8272	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-938-0219	MK-1324/V ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-1790	INSTALLATION KIT FOR MX-7778A/GRC	1

SECTION II ADDITIONAL AUTHORIZATIONAL LIST

NATIONAL STOCK NUMBER	DESCRIPTION	QTY
	RADIO SET USED IN M163	
	AN/VRC-47:	
5820-00-401-9659	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-401-9712	MK-1477/V ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-2023	INSTALLATION KIT FOR MX-7778A/GRC	1
	RADIO SETS USED IN M551, A1	
	AN/VRC-12:	
5820-00-493-3038	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-493-7533	MK-1258/GRC ACCESSORY KIT (FOR RADIO)	1
5915-01-024-3877	SUPPRESSOR, ELECTRICAL TRANSIENT (MINI-SUPPRESSOR)	1
	AN/VRC-46:	
5820-00-493-3038	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-493-7533	MK-1258/GRC ACCESSORY KIT (FOR RADIO)	1
5915-01-024-3877	SUPPRESSOR, ELECTRICAL TRANSIENT (MINI-SUPPRESSOR	1
	AN/VRC-47:	
5820-00-493-3038	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-493-7533	MK-1258/GRC ACCESSORY KIT (FOR RADIO)	1
5915-01-024-3877	SUPPRESSOR, ELECTRICAL TRANSIENT (MINI-SUPPRESSOR	1
	RADIO SETS USED IN M577, A1	
	AN/VRC-12:	
5820-00-493-7513	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-938-0242	MK-1320/V ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-1694	INSTALLATION KIT FOR MX-7778A/GRC	1

SECTION II ADDITIONAL AUTHORIZATIONAL LIST

NATIONAL STOCK NUMBER	DESCRIPTION	QTY
	AN/VRC-43:	
5820-00-762-4876	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-938-0249	MK-1323/G ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-1694	INSTALLATION KIT FOR MX-7778A/GRC	1
	AN/VRC-45:	
5820-00-493-7514	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-938-0243	MK-1321/V ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-1694	INSTALLATION KIT FOR MX-7778A/GRC	1
	AN/VRC-46:	
5820-00-762-4876	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-938-0249	MK-1323/G ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-1694	INSTALLATION KIT FOR MX-7778A/GRC	1
	AN/VRC-47:	
5820-00-493-7513	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-938-0242	MK-1320/V ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-1694	INSTALLATION KIT FOR MX-7778A/GRC	1
	AN/VRC-49:	
5820-00-493-7514	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-938-0243	MK-1321/V ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-1694	INSTALLATION KIT FOR MX-7778A/GRC	1

SECTION II ADDITIONAL AUTHORIZATIONAL LIST

NATIONAL STOCK NUMBER	DESCRIPTION	QTY
	RADIO SET USED IN M578	
	AN/VRC-46:	
5820-00-494-6638	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-938-0215	MK-1296/G ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-2006	INSTALLATION KIT FOR MX-7778A/GRC	1
	RADIO SET USED IN M728	
	AN/VRC-46:	
5820-00-494-6630	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O VEHICLE)	
5820-00-494-6649	MK-1274/G ACCESSORY KIT (FOR RADIO)	1
5915-00-431-6718	MX-7778A/GRC SUPPRESSOR, ELECTRICAL TRANSIENT	1
5820-00-412-2022	INSTALLATION KIT FOR MX-7778A/GRC	1
	RADIO SETS USED IN CATAMARINE AIR BOAT	
	AN/VRC-12:	
5820-00-493-7492	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O BOAT)	
5820-00-494-6663	MK-1292/V ACCESSORY KIT (FOR RADIO)	1
	AN/VRC-46:	
5820-00-493-7491	INSTALLATION HARNESS (FOR RADIO/INTERCOM, P/O BOAT)	
5820-00-494-6647	MK-1283/G ACCESSORY KIT (FOR RADIO)	1

SECTION II ADDITIONAL AUTHORIZATIONAL LIST

NATIONAL STOCK NUMBER	PART NUMBER AND FSCM	DESCRIPTION	USABLE ON CODE	UNIT OF MEAS	QTY AUTH
		ADAPTER			
5935-00-149-3534	UG-273/U	80058		EA	
5935-00-666-1649	UG-306B/U	80058		EA	
		AMPLIFIER, AUDIO FREQUENCY			
5820-00-892-3342	AM-1780/URC	80063		EA	
		ANTENNA, ELEMENTS			
5985-00-199-8831	MS-116A	80063		EA	
5985-00-115-7149	MS-117A	80063		EA	
5985-00-238-7474	MS-118A	80063		EA	
		CONTROL, FREQUENCY SELECTOR			
5820-00-892-3343	C-2742/VRC	80063		EA	
		CONTROL, INTERCOMMUNICATION SET			
5820-00-892-3337	C-2296/VRC	80058		EA	
5820-00-892-3338	C-2297/VRC	80058		EA	
5820-00-892-3339	C-2298/VRC	80058		EA	
		CONTROL, RADIO SET			
5820-00-892-3340	C-2299/VRC	80058		EA	
		HANDSET			
5965-00-069-8886	H-189/GR	80058		EA	
5965-00-043-3463	H-250/U	81134		EA	
		CABLE ASSEMBLY, POWER, ELECTRICAL			
5995-00-889-0900	CX-4720 VRC (1 Ft.)	80058		FT	
5995-00-169-6049	CX-4720 VRC (3 Ft.)	80058		FT	
5995-00-889-0708	CX-4720 VRC (4 Ft.)	80058		FT	
5995-00-823-2828	CX-4720 VRC (5 Ft.)	80058		FT	
5995-00-823-2827	CX-4720 VRC (6 Ft.)	80058		FT	
5995-00-889-1148	CX-4720 VRC (8 Ft.)	80058		FT	
5995-00-823-2726	CX-4720 VRC (10 Ft.)	80058		FT	
5995-00-889-1253	CX-4720 VRC (12 Ft.)	80058		FT	
5995-00-823-2854	CX-4720 VRC (14 Ft.)	80058		FT	
5995-00-985-8395	CX-4720 VRC (16 Ft.)	80058		FT	
5995-00-889-0836	CX-4720 VRC (20 Ft.)	80058		FT	
5995-00-987-1299	CX-4720 VRC (30 Ft.)	80058		FT	
5995-00-985-7877	CX-4721 VRC (2 Ft.)	80058		FT	
5995-00-823-2770	CX-4721 VRC (3 Ft.)	80058		FT	
5995-00-823-8945	CX-4721 VRC (5 Ft.)	80058		FT	
5995-00-823-2769	CX-4721 VRC (6 Ft.)	80058		FT	
5995-00-823-2852	CX-4721 VRC (8 Ft.)	80058		FT	
5995-00-823-2912	CX-4721 VRC (10 Ft.)	80058		FT	

SECTION II ADDITIONAL AUTHORIZATIONAL LIST

NATIONAL STOCK NUMBER	PART NUMBER AND FSCM	DESCRIPTION	USABLE ON CODE	UNIT OF MEAS	QTY AUTH
		CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL			
5995-00-823-2817	CX-4722 VRC (2 Ft.)	80058		FT	
5995-00-823-2824	CX-4722 VRC (3 Ft.)	80058		FT	
5995-00-823-2820	CX-4722 VRC (7 Ft.)	80058		FT	
		HEADSET			
5965-00-892-1010	H-140/U	80058		EA	
5965-00-043-3460	H-251/U	81134		EA	
		HEADSET-MICROPHONE			
5965-00-179-3789	H-161/U	80058		EA	
		HEADSET-MICHROPHONE KIT			
5965-00-937-1850	MK-1039/G	81349 (Installed in CVC Helmet T-56-6)		EA	
5965-00-313-8958	MK-1697/G	80058 (Installed in AVC Helmet 23-72)		EA	
		LOUDSPEAKER			
5965-00-876-2375	LS-454/U	80058		EA	
		MAST BASE			
5985-00-221-5544	AB-15/GR	80058		EA	
5820-00-474-6163	AB-558/GR	80058		EA	
		MICROPHONE			
5965-00-179-7762	M-80/U	81349		EA	
		MOUNTING			
5820-00-893-1323	MT-1029/VRC	80063		EA	
5820-00-893-1324	MT-1898/VRC	80063		EA	
		CABLE ASSEMBLY, RADIO FREQUENCY			
5995-00-823-2986	CG-1773A/U,B/U(3 Ft.)	88058		FT	
5995-00-889-1037	CG-1773A/U (4 Ft.)	88058		FT	
5995-00-823-2990	CG-1773A/U (8 Ft.)	88058		FT	
5995-00-985-8394	CG-1773A/U (16 Ft.)	88058		FT	
5995-00-823-2987	CG-1773B/U (4 Ft.)	88058		FT	
5995-00-823-2988	CG-1773B/U (5 Ft.)	88058		FT	
5995-00-823-2989	CG-1773B/U (6 Ft.)	88058		FT	
5995-00-823-2991	CG-1773B/U (7 Ft.)	88058		FT	
5995-00-823-3074	CG-1773B/U (9 Ft.)	88058		FT	
5995-00-823-3073	CG-1773B/U (10 Ft.)	88058		FT	
5995-00-823-2992	CG-1773B/U (12 Ft.)	88058		FT	
5995-00-926-8310	CG-1773B/U (13 Ft.)	88058		FT	
5995-00-985-7551	CG-1773B/U (15 Ft.)	88058		FT	

SECTION II ADDITIONAL AUTHORIZATIONAL LIST

NATIONAL STOCK NUMBER	PART NUMBER AND FSCM	DESCRIPTION	USABLE ON CODE	UNIT OF MEAS	QTY AUTH
		CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL			
5995-00-823-2788	CX-7056/VRC (2 Ft.)	80058		FT	
5995-00-823-2789	CX-7057/VRC (2 Ft.)	80058		FT	
5995-00-889-1149	CX-7057/VRC (3 Ft.)	80058		FT	
5995-00-933-4601	CX-7057/VRC (5 Ft.)	80058		FT	
5995-00-823-2869	CX-7058/VRC (2 Ft.)	80058		FT	
5995-00-823-2796	CX-7058/VRC (3 Ft.)	80058		FT	
5995-00-889-0389	CX-7058/VRC (4 Ft.)	80058		FT	
5995-00-889-0828	CX-7058/VRC (7 Ft.)	80058		FT	
5995-00-823-2915	CX-7085/VRC (9 Ft.)	80058		FT	
5995-00-823-2865	CX-7059/VRC (5 Ft.)	80058		FT	
5995-00-261-9873	CX-7059/VRC (6 Ft.)	80058		FT	
5995-00-985-8072	CX-7059/VRC (7 Ft.)	80058		FT	
5995-00-823-2751	CX-7059/VRC (8 Ft.)	80058		FT	
5995-00-889-0703	CX-7059/VRC (9 Ft.)	80058		FT	
5995-00-823-2752	CX-7059/VRC (10 Ft.)	80058		FT	
5995-00-823-2753	CX-7059/VRC (11 Ft.)	80058		FT	
5995-00-889-0596	CX-7059/VRC (12 Ft.)	80058		FT	
5995-00-889-0941	CX-7059/VRC (13 Ft.)	80058		FT	
5995-00-935-0270	CX-7059/VRC (14 Ft.)	80058		FT	
5995-00-889-0616	CX-7059/VRC (15 Ft.)	80058		FT	
5995-00-889-0766	CX-7059/VRC (17 Ft.)	80058		FT	
5995-00-261-9875	CX-7059/VRC (18 Ft.)	80058		FT	
5995-00-823-2872	CX-4722/VRC (9 Ft.)	80058		FT	
5995-00-823-2818	CX-4722/VRC (10 Ft.)	80058		FT	
5995-00-823-8030	CX-4722/VRC (11 Ft.)	80058		FT	
5995-00-823-2910	CX-4722/VRC (12 Ft.)	80058		FT	
5995-00-985-7884	CX-4722/VRC (14 Ft.)	80058		FT	
5995-00-985-7618	CX-4722/VRC (15 Ft.)	80058		FT	
5995-00-985-8393	CX-4722/VRC (16 Ft.)	80058		FT	
5995-00-985-8090	CX-4722/VRC (20 Ft.)	80058		FT	
5995-00-985-7880	CX-4722/VRC (30 Ft.)	80058		FT	
5995-00-491-7107	CX-4722A/VRC (4 Ft.)	80058		FT	
5995-00-491-7106	CX-4722A/VRC (5 Ft.)	80058		FT	
5995-00-258-8423	CX-4722A/VRC (6 Ft.)	80058		FT	
5995-00-408-2661	CX-4722A/VRC (8 Ft.)	80058		FT	
5995-00-823-2830	CX-4723/VRC (2 Ft.)	80058		FT	
5995-00-823-2831	CX-4723/VRC (3 Ft.)	80058		FT	
5995-00-823-2832	CX-4723/VRC (4 Ft.)	80058		FT	
5995-00-823-2833	CX-4723/VRC (5 Ft.)	80058		FT	
5995-00-823-2834	CX-4723/VRC (6 Ft.)	80058		FT	
5995-00-823-2835	CX-4723/VRC (8 Ft.)	80058		FT	
5995-00-823-2836	CX-4723/VRC (9 Ft.)	80058		FT	
5995-00-823-2837	CX-4723/VRC (10 Ft.)	80058		FT	
5995-00-823-2838	CX-4723/VRC (12 Ft.)	80058		FT	
5995-00-823-2839	CX-4723/VRC (13 Ft.)	80058		FT	

SECTION II ADDITIONAL AUTHORIZATIONAL LIST

NATIONAL STOCK NUMBER	PART NUMBER AND FSCM	DESCRIPTION	USABLE ON CODE	UNIT OF MEAS	QTY AUTH
5995-00-823-2840	CX-4723/VRC (14 Ft.)	80058		FT	
5995-00-823-2841	CX-4723/VRC (15 Ft.)	80058		FT	
5995-00-823-2842	CX-4723/VRC (16 Ft.)	80058		FT	
5995-00-823-2843	CX-4723/VRC (18 Ft.)	80058		FT	
5995-00-889-0757	CX-4723/VRC (20 Ft.)	80058		FT	
5995-00-823-2787	CX-7055/VRC (1.5 Ft.)	80058		FT	
5995-00-889-0888	CX-7055/VRC (3 Ft.)	80058		FT	
5995-00-823-2867	CX-7055/VRC (4 Ft.)	80058		FT	
5995-00-889-1022	CX-7055/VRC (5 Ft.)	80058		FT	
5995-00-823-2916	CX-7055/VRC (6 Ft.)	80058		FT	
5995-00-823-2868	CX-7056/VRC (1 Ft.)	80058		FT	
5995-00-985-8321	CX-7060/VRC (2 Ft.)	80058		FT	
5995-00-926-0769	CX-7060/VRC (3 Ft.)	80058		FT	
5995-00-926-0770	CX-7060/VRC (4 Ft.)	80058		FT	
5995-00-823-2782	CX-7060/VRC (5 Ft.)	80058		FT	
5995-00-985-8385	CX-7060/VRC (6 Ft.)	80058		FT	
5995-00-823-2784	CX-7060/VRC (7 Ft.)	80058		FT	
5995-00-985-8351	CX-7060/VRC (9 Ft.)	80058		FT	
5995-00-258-8407	CX-7060/VRC (10 Ft.)	80058		FT	
5995-00-926-0778	CX-7060/VRC (14 Ft.)	80058		FT	
5995-00-823-2802	CX-7328/VRC (2 Ft.)	80058		FT	
5995-00-823-2803	CX-7328/VRC (3 Ft.)	80058		FT	
5995-00-823-2797	CX-7555/VRC (4 Ft.)	80058		FT	
5995-00-823-2799	CX-7555/VRC (6 Ft.)	80058		FT	
5995-00-823-2870	CX-7621/VRC (4 Ft.)	80058		FT	
5995-00-987-1331	CX-7621/VRC (6 Ft.)	80058		FT	
5995-00-926-0834	CX-7867/VRC (6 Ft.)	80058		FT	
5995-00-889-1130	CX-7867/VRC (10 Ft.)	80058		FT	
5995-00-889-0784	CX-7867/VRC (12 Ft.)	80058		FT	
5995-00-935-0383	CX-7867/VRC (13 Ft.)	80058		FT	

APPENDIX D
EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

D-1. Scope

This appendix lists expendable supplies and materials you will need to operate and maintain the Radio Sets AN/VRC-12 and AN/VRC-43 through AN/VRC-49. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

D-2. Explanation of Columns

a. Column 1—Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use cleaning compound, item 5, App. D").

b. Column 2—Level. This column identifies the lowest level of maintenance that requires the listed item.

C—Operator/Crew

O—Organizational Maintenance

F—Direct Support Maintenance

H—General Support Maintenance

c. Column 3—National Stock Number. This is the National stock number assigned to the item; use it to request or requisition the item.

d. Column 4—Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturer (FSCM) in parentheses, if applicable.

e. Column 5—Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

SECTION II. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NO.	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION PART NO. AND FSCM		(5) UNIT OF MEAS
1	C	5970-00-816-6056 419-4291	HH-I-595B1080 MIL-I-24391	Insulation Tape, Electrical 81349	FT
2	C	6850-00-880-7616	MIL-S-8660	Silicone Compound 81349	OZ
3	C	5905-00-293-4208		Lockwire (safety wire) 30889	EA
4	C	6850-00-105-3084	MS180	Cleaning Compound, FREON-TF 18589	OZ
5	C	5330-00-905-6032	S91	O'Ring 80063	EA
6	C	7510-00-290-8036	PPP 97 TYPE 1	Pressure Sensitive Tape, Filament Reinforced 81348	YD

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2-25	2-28			Recommend that the installatior antenna alignment procedure be changed throughout to specify a 2° IFF antenna lag rather than 1°. REASON: Experience has shown that with only a 1° lag, the antenna servo system is too sensitive to wind gusting in excess of 25 knots, and has a tendency to rapidly accelerate and decelerate as it hunts, causing strain to the drive train. Hunting is minimized by adjusting the lag to 2° without degradation of operation.
3-10	3-3		3-1	Item 5, Function column. Change "2 db" to "3db." REASON: The adjustment procedure the the TRANS POWER FAULT indicator calls for a 3 db (500 watts) adjustment to light the TRANS POWER FAULT indicator.
5-6	5-8			Add new step f.1 to read, "Replace cover plate removed in step e.1, above." REASON: To replace the cover plate.
		F03		Zone C 3. On J1-2, change "+24 VDC to "+5 VDC." REASON: This is the output line of the 5 VDC power supply. +24 VDC is the input voltage.

SAMPLE

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